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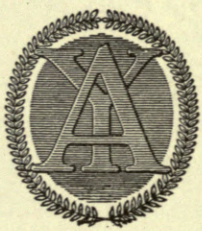

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MINE ACCOUNTING
AND
COST PRINCIPLES

MINE ACCOUNTING

AND

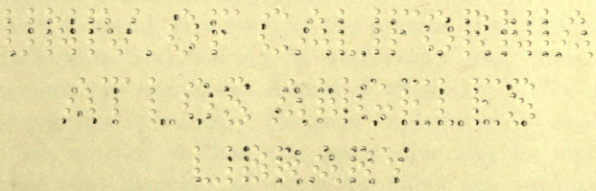
COST PRINCIPLES

BY

T. O. McGRATH

AUDITOR OF THE SHATTUCK-ARIZONA COPPER COMPANY

FIRST EDITION
FIFTH IMPRESSION



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PREFACE

The present tax laws of most of the States and of the Federal Government require that accurate records be kept and that complete reports be made to the Government of the results of each year's business. The employes of large industrial units are demanding that they be informed of the results of their labor, and be given a share either of the profits of the business or in the savings resulting from their increased efficiency or effort. The general public is insisting that, being the consumer of all products, the costs and profits of industry shall be accurately determined and made public. As the result of the gradual depletion of our richest deposits of minerals the mining industry is operating on a narrower margin of profit than at any time in its history, and must know its costs from month to month to protect against loss. Also, it is now recognized that a mining enterprise may be properly equipped with the best of mechanical appliances and have an organization of high ability and employes embued with the spirit of co-operation, nevertheless the business cannot be intelligently managed without a knowledge of the results of operation and the condition of the business for each operating period, which information can be obtained only by proper accounting and costing.

Therefore, each unit of the mining industry feels the need not only of accurately determining its costs and profits so as to have an intelligent guide to operations, and to meet the requirements of the Government, the public and of its employes, but to compile the accounting and costing data in as uniform a manner as possible so as to obtain the benefit of the operating data compiled by the other units of the industry.

To meet this need there is an urgent demand for a complete presentation of accounting and costing of mining operations compiled on a scientific basis and in a uniform manner.

In spite of this demand, however, at the present time the published literature is inadequate and lacking in uniformity and there is practically no agreement nor any great degree of efficiency in the accounting and costing practice of mines. The only explanation of the present status of mine accounting is that the great diversity in methods of mining, treatment and disposal of mine products, as well as in the character of the mines themselves limits the treatment of the subject to a description of individual systems and accounts unless the fundamental principles underlying all mining operations are recognized.

Up to date there have been two principal methods of illustrating accounting procedure: one, by means of books and records used in the business, and the other by means of accounts and statements used in

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the business. When the first method is used there is explained how the books are kept in order to get a Balance Sheet and a Profit and Loss, or Income Statement. When the second method is used the balance sheet and the profit and loss account are taken as the basis and there is explained what should enter into these and subsidiary accounts, and what records should be kept to support the balance sheet and profit and loss or income account.

While it is true that the two principal objects of accounting are, to obtain a balance sheet showing the condition of the business at the end of the operating period, and, a profit and loss statement showing the results of the period's operation, nevertheless these two statements are only the results of the accounting and are not the basis of the accounting. Neither are the books the basis of the accounting as they are only part of the accounting machinery. While the accounts are the basis of the accounting they will show the true condition of the business only when they have been created in harmony with the principles underlying the business.

In this presentation of General and Cost Accounting, a new method has been used: First, in order to determine the basis of the accounting, the business has been analyzed and a statement of the principles of the mining business has been drawn; second, charts of accounts have been created that will correctly reflect these principles upon the ledger; third, schedules are drawn showing the charges and credits to these accounts to insure uniformity and correctness; fourth, books and records are created that will allow of the compiling of the operating and business data so as to give a balance sheet showing the true condition of the business and an income or profit and loss statement that will give the results of the period's operation. The accounting procedure is then handled in the order in which the business is done.

It is believed that the correct basis of accounting for mining has been presented herein and that this basis will allow of uniformity in accounting and costing procedure for all mines regardless of operating methods or the character of the ores treated. To achieve such uniformity would result in great benefit to the mining industry and in the directors, managers and department heads comprehending the business from an accounting standpoint as well as from the angle of operations.

The object has not been to endeavor to exhaust the subject of accounting and costing as applied to mining, nor to present the different systems and methods now in use by mines, mills and smelters, but simply to state the principles and to present sufficient forms, charts, records and procedure to illustrate how the principles are applied in actual practice. Also the subject has been worked out in the form of a manual and each sub-division is taken in logical order which should make the book of more value to those who wish practical working knowledge of mine accounting.

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INTRODUCTORY

INTRODUCTION—GENERAL ACCOUNTING

MINE ACCOUNTING AND COST PRINCIPLES

CHAPTER I

INTRODUCTION

The Business of Mining.—Before taking up the subject of Accounting for mining it is best to have a clear conception of the business as compared to other business ventures. While the ultimate object of the business of mining is to win a profit from operations the same as in all other lines of business, nevertheless the hazards and the nature of the business differ considerably from other industries.

In order to make these differences clear, we will set forth the principal features, as follows:

First.—The initial investment in mining claims, development and equipment must be proven by the discovery of commercial ore of a net value equal to the amount of investment before the investor can be reasonably assured of the return of his capital, which will then be subject only to the fluctuations in the metal, material and labor markets.

In other lines of business the amount of investment in merchandise, raw materials, property, etc., has a certain marketable value from the moment of purchase, and can be disposed of at any time thereafter, for the amount of capital invested therein, plus a reasonable profit, subject to fluctuations in the material and labor markets and to competition.

Second.—The income of a mine is determined principally by the amount that the net value of the ore discovered is in excess of the investment in mining claims, development and equipment, while the income of other industries is determined by the price at which the purchased or manufactured article can be sold above the cost of production, and the quickness with which the investment is turned.

Third.—It takes from three to seven years as a rule, after necessary development equipment has been installed on a mineral property, to prove the value of the property, during which time the investor stands to lose not only the interest on his money, but all or part of his principal, depending upon the amount of the net value of the commercial ore, if any, that may be discovered. Other lines of industry have the value of their investment established immediately upon the acquisition of their

stock and are able, as soon as equipment necessary to handle the business can be installed, to offer their product for sale at as high a figure above the investment cost as competition and the law of supply and demand, etc., will allow.

Fourth.—Mining, in taking the risk involved in proving its initial investment as well as being deprived of any return on its investment during this period, and being a wasting industry, must obtain a higher rate of income, after the mine has been proven to be income-bearing property, than is obtained by other business in order to insure, before exhaustion, the same average return of income as other lines of industry.

Fifth.—To operate a producing mine requires extraction of ore and sale of its recoverable contents, which eventually exhausts the property. Therefore, to continue the life of the business and to keep the organization intact, requires that the same risk and uncertainty and delay in return on investment as in the beginning of the business must again be taken in the reinvestment in new properties before the exhaustion of each proven property. In the case of other lines of business that have an established trade it is simply a question of reinvesting the liquidated capital that was invested in stock, in the purchase of new stock of finished or raw materials, which, in the case of successful commercial enterprises, is done three or more times during each year's operation, without any hazard whatsoever.

In addition to the main points set forth above, mines are subject to accidents by fire, floods and cave-ins, of greater magnitude than is the case in other lines of business; this at times results in an operating loss even after the mine has been proven to be an income-earning property, and against which there is no insurance except in the case of accident to employees.

A proven property has not only to assume the risks and uncertainties above specified, which are not assumed by other lines of business, but must also bear the risks common to all business of fluctuations in the price of metals, wages of labor and cost of supplies, as well as strikes and acts of nature, which at times may result in a proven mine operating at a loss for any one period.

RELATIONSHIP OF ACCOUNTING TO THE BUSINESS

Accounting is not a collection of arbitrary forms, systems, etc., that can be applied to each and every business, but is the application of certain principles to the business by means of double entry bookkeeping, of mathematics, accounts, forms, records, and systems in such manner so as to determine and show the true condition of a business and the actual operating results for any one period of operation in costs and the profit or loss.

As accounting is concerned with the results of each of the departments of the business and of the business as a whole, it is necessary first to have a clear understanding of the fundamental duties of each of the departments, *which from an operating standpoint* may be set forth, as follows:

The function of Engineering is to furnish the technical information necessary to production and to design, specify, improve and maintain the equipment, materials and products; Purchasing is the obtaining, transporting and storing of the materials; Superintendence is the application of the labor of the men and the use of the materials to the production of the product; Selling is the advertising, disposition and distribution of the product; while Management is the coordination and regulation of all these operating departments into one harmonious, efficient working whole in conformity with the policies of the Executive Board.

Finance is the obtaining and disbursing of the money to procure men and materials necessary to carry on production, the disbursing of earnings, and the banking and investing of surplus earnings and capital returned from production; the Executive is concerned with determining policies and the bringing of the business into a harmonious working whole in conformity with the market conditions of supply and demand, etc., so as to achieve the greatest profit obtainable to the best interests of the business and of all its working parts. *While the above definitions may not be theoretically correct, they concisely set forth the duties usually assigned to the different operating departments in mining organizations of the present time. Engineering is considered to include the geological, assaying, mechanical, and power departments.*

In very large organizations there is the Advisory or Consulting Departments, covering the legal, technical and social or industrial sides of the business.

This brings us up to Accounting which is not concerned with any one department of work but with the accounting for the money, materials and product, and the showing of the results of each and every department of labor, both operating and administrative, and of the business as a whole.

The relation of Accounting to the Executive and Financial Departments is advisory, the same as Operating Engineering is to Purchasing, Production and Management. While Engineering is of first importance to Purchasing and Production, Accounting is of equal value to Engineering in Management, and is of first importance to Selling and Finance, as the determining of the profit is the thing of first importance to every business, and the showing of costs, earnings and the condition of each operating department of a producing mine is absolutely necessary to intelligent and efficient management.

Therefore, it can be readily understood that any treatise that will

set forth the principles of accounting, as applied to mining more clearly and in a more practicable manner will be of great benefit to the business of mining.

ORGANIZATION OF THE BUSINESS

Before endeavoring to set forth the functions of one department of a business one must first have a distinct concept of the business as a whole, and of each department's relation to the other departments.

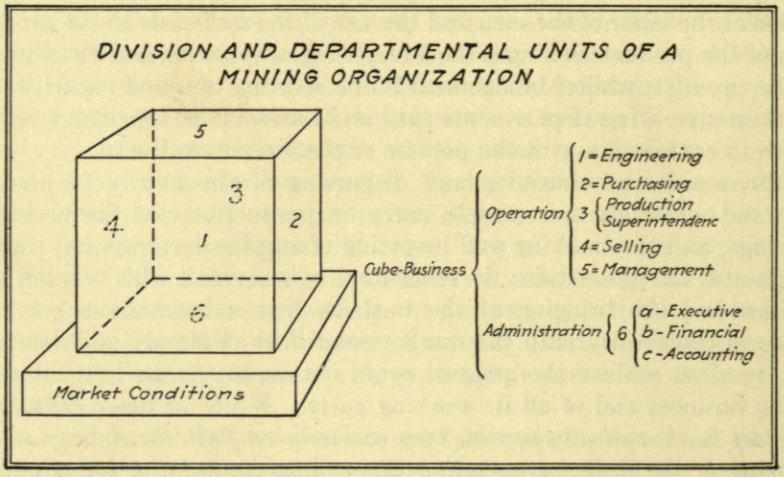

CHART I.

The business of mining consists of the two grand divisions of Administration and Operation, and can be symbolized by a cube, the four sides representing the Operating Departments of:

ENGINEERING
PURCHASING
PRODUCTION OR SUPERINTENDENCE and
SELLING

the top Management, and the bottom the Administrative Departments of:

EXECUTIVE
FINANCIAL and
ACCOUNTING

That upon which the cube, or business, rests is the market conditions. In a properly organized business, sufficiently large to require separate departmental organizations, each of these divisions will have its head. Nevertheless, the functions and work of each will be so intertwined as to make a consistent working whole. Also while each department will

be concerned with its own duties, it will in a minor way within its own organization, exercise the functions of each and all of the other departments.

The Executive is represented in operations by the Management, which is symbolized by the top of the cube, and contacts all operating departments, while Finance is represented in operations by Accounting, which is symbolized by the bottom of the cube, and also contacts all operating departments.

Therefore, in a properly organized mining business the Accounting Department is generally divided into two divisions to conform to the Operating and Administrative sections of the business.

DEFINITION OF ACCOUNTING TERMS

As accounting is the language of business, there is great need of standardization in the use of all accounting terms and a clear definition as to the meaning of each term in order to do away with the present ambiguity in the statements of business and to fill the lack of uniform business data.

The effort has been made in the following pages to be uniform in the use of business and accounting terms and so to set forth the facts as to allow of clear concepts of the meaning of the usual terms.

NEED FOR BETTER UNDERSTANDING OF ACCOUNTING

In the production of its product, the business of mining requires the employment and utilization of men, money, machinery and materials, and the profitable operation of the business depends principally upon the intelligence, ability and cooperation of the men who constitute the executive, administrative and operative force, generally spoken of as Capital Management and Labor.

In the present day organizations, Capital, the Stockholders, is represented by the Board of Directors and the Financial and Accounting Departments; Management by the Executive Department the Manager and the heads of the Engineering, Purchasing, Superintendence and Selling Departments; while Labor has had little or no representation in the organization except as raw material, until recently.

The primary function of accounting is the recording, analyzing and distributing of the money, men, materials and product involved in the activities of each and every department of the business so as to show at set intervals the total net results of the business in costs and earnings and the true condition of the business, thereby keeping the whole organization informed of the facts. To do this, however, the principles of the accounting system in all its details must be based upon and be identical with the principles and organization of the business, otherwise a perfect

photograph of the business in figures cannot be obtained. Therefore, the accounting system can be perfected only as the organization is perfected.

Considering the nature of accounting, it can be readily seen why uniformly efficient and intelligent accounting results in an organization of size is so difficult to obtain; also why it is necessary that all the accounting should be a complete unit and be under one head, and that this head should be familiar with all the details of the organization and business and that each of the operating heads should have at least a working knowledge of accounting. No other department of the organization requires such a broad knowledge of the business details and fundamentals, nor is so dependent upon the cooperation of the other departments in order to properly execute its work. The importance of accounting is shown by the fact that no department of the business can express the results of its activity, or carry on its work intelligently for any length of time, without the assistance of accounting, nor can the results of the business, nor its condition be shown except through accounting and costing.

Therefore, a knowledge of its basic principles is essential not only to the employees of the Accounting Department and to every departmental head of the business, but to every stockholder or person who relies upon the reports of directors and officers for his knowledge of the business in which he has invested his money.

CHAPTER II

GENERAL ACCOUNTING

General Accounting is the applying of the principles of accounts to a business so as to show the results of operations in profit or loss, and to obtain a true statement of the condition of the business at the end of each operating period.

PURPOSE OF ACCOUNTING

Mining is a business, the same as other industries, and is operated for the profit to be obtained therefrom. Therefore, proper accounting is as necessary to intelligent and profitable operation and management as proper engineering is to the efficient production of mining.

Accounting efficiency can not be obtained unless there is a definite idea of the results desired and of the methods of procedure. The purpose of accounting may be summarized, as follows:

1. To verify and check, analyze and record, the business transactions and the operations in such manner as to show at regular intervals a true, correct and intelligent statement of the condition of the business, and the results of operations in costs and earnings.
2. To furnish to the officers and to the different operating department heads the results of operations for each period, within such time as to enable them to utilize the knowledge obtained therefrom in the succeeding period.
3. To summarize and compare the results of the operations of each period and report to the Manager and Directors the fluctuations when compared with previous periods.

The check of the reports, statements, etc., of the business transactions and of the operations should determine the accuracy of each individual item, or operation, and the verification of each transaction or operation should be such as to reduce leaks, thefts, extravagances, omissions and misrepresentations to a minimum.

The Accounting Department is not to decide as to whether or not efficiency has been obtained in the different department operations, but is to report the actual results, conditions and fluctuations of the departmental operations to the management and to the executive in such manner as to enable them to ascertain whether or not efficiency is being obtained, and to furnish to the different department heads all the accounting information that may be necessary to assist each to obtain efficiency.

ORGANIZATION OF ACCOUNTING DEPARTMENT

In order to conform with the general organization of mining operations, the accounting is usually divided into two departments.

1. Administrative Department.
2. Operating Department.

The Administrative or Corporate Department is concerned, first, with the accounting in connection with promotion and organization, and, finally, with the dissolution of the business. However, its principal concern is with the results of the Operating Department covering the development, the equipment, and the production of the mine property. The Administrative Department is under the direct supervision of the Secretary and the Treasurer of the company, and the indirect supervision of the Auditor or Comptroller.

In large business organizations of many branches or subsidiary organizations, the accounting that is usually done by the Treasurer and the Secretary, concerning the administrative side of the business is sometimes done under the supervision of a Comptroller who is the general head of the accounting, while the General Auditor is the head of the operating accounting and costs, etc., and his assistants are the auditors who verify the accounting work of the different operating organizations and departments.

The Operating Department is concerned with the details of the development, equipment and production operations of the mine and other property, and the transmitting of the results of operations to the Administrative Department. The Operating Department is generally directly under the Chief Clerk or Chief Accountant and indirectly under the Auditor.

The organization of the Accounting Department depends on the form of organization of the business, whether corporate, partnership, etc., the scale of operations, the method of mining and treatment of ores, and the disposition of the mine and smelter product. As the mining business is generally carried on in the corporate form the accounting methods, etc., set forth in this treatise will be those particularly applicable to a corporation.

The organization of the Operating Department may be a single unit under the Chief Clerk or Chief Accountant, with one set of books and records whose accounts are closed directly into the Administrative Department's books; or the organization may be of several units under an Accountant for each unit, with separate sets of books and records whose accounts are closed either into a set of general operating books and then into the Administrative or Corporate Department's books, or closed directly into the Administrative Department's books.

Again, the Mine Department may be the principal unit and the other departments, such as the Smelting, Refining, and Selling, etc., be sub-

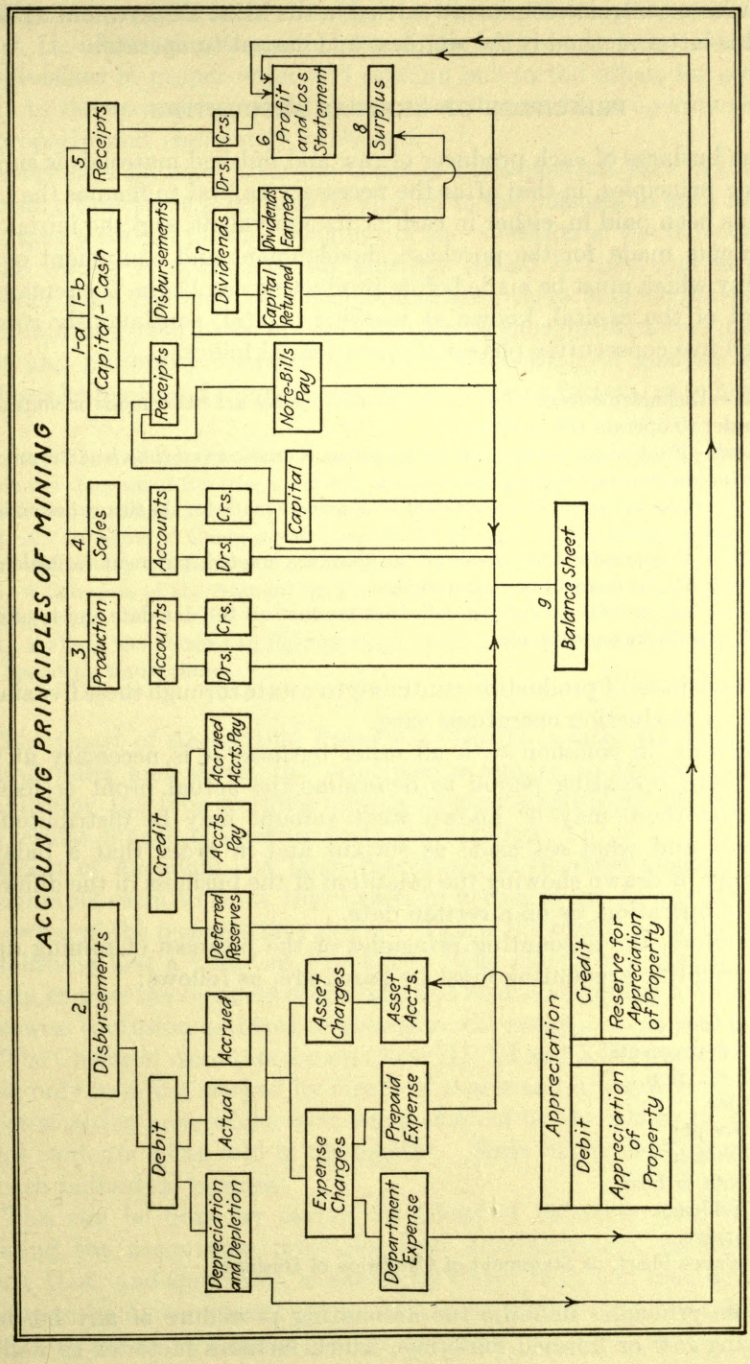
ACCOUNTING PRINCIPLES OF MINING
1-a
1-b
Capital-Cash
Receipts
Disbursements
Receipts
Note-Bills Pay
Capital
Dividends
Capital Returned
Dividends Earned
Drs.
Crs.
Profit and Loss Statement
Surplus
Sales
Accounts
Drs.
Crs.
Production
Accounts
Drs.
Crs.
Balance Sheet
Credit
Accrued Accts. Pay
Accts. Pay
Deferred Reserves
Disbursements
Debit
Accrued
Actual
Depreciation and Depletion
Asset Charges
Asset Accts.
Expense Charges
Prepaid Expense
Department Expense
Appreciation
Debit
Appreciation of Property
Credit
Reserve for Appreciation of Property

CHART II.

units whose control accounts are carried in the Mine Department's books; and this latter method is the simplest and easiest to operate.

PRINCIPLES OF GENERAL ACCOUNTING

The business of each producer of raw and finished materials is similar in basic principles, in that after the necessary capital to finance the business has been paid in, either in cash or its equivalent, and the initial disbursements made for the purchase, development and equipment of the property which must be made before production can begin, the remaining amount of the capital, known as working capital, continuously rotates through five consecutive phases of operation, as follows:

First.—Disbursements of labor, materials and expense are either made or contracted for in order to operate the business.

Second.—Production as the result of operation is created and shown at the amount of the expense invested in the product.

Third.—Sales are made of the product or contracts made for the future deliveries of the product.

Fourth.—Receipts for the delivery of the sales are created, payment for which the buyers or other parties will be responsible.

Fifth.—Cash is received for the delivered product on the due date and is used to liquidate the disbursements, etc.

The business of production continues to rotate through these five stages as long as production operations exist.

However, in common with all other business it is necessary at the end of each operating period to determine the actual profit or loss in order that there may be known what amount may be distributed as dividends and what set aside as surplus and in order that a balance sheet may be drawn showing the condition of the business in the different stages of operation, as on a certain date.

Therefore, the accounting principles of the business of mining upon which scientific accounting must be based are, as follows:

1. (*a*) Capital.
2. Disbursements.
3. Production.
4. Sales.
5. Receipts.
1. (*b*) Cash.
6. Profit or Loss.
7. Dividends.
8. Surplus.
9. Balance Sheet, or Statement of Condition of Business.

These principles underlie the accounting procedure of any business producing raw or finished materials, which includes factories as well as mines, regardless of the individual character of the business.

The first requisite is the drawing of a Chart of Principles, as shown by Chart II, illustrating the principles of the business and the accounting sub-divisions in proper order and relation one to the other, for use as a guide in the accounting, and in order that the results of operations may be properly and completely expressed.

Working Factors.—After the Chart of Principles has been drawn it is necessary that these principles be applied to the business in such manner as to give a correct picture in figures of the condition of the business and of the results of operations for any one period in costs and earnings. In order that this may be obtained and that there may be determined a definite and true basis upon which the accounting structure may be built and uniformly operated, it is necessary that an analysis of the business be made and there be established working factors, as follows:

1. A "Chart of Accounts" in harmony with the Accounting Principles, that will enable the showing of the true condition of the business, and the results of operations in costs and earnings.
2. A "Schedule of Charges and Credits" to be made to the different accounts to insure uniformity and accuracy in compiling the results of operations.
3. A Schedule of the Accounting Procedure so as to establish a uniform efficient working whole.
4. A File of the Forms and Records upon which to compile and record the business and operating transactions.

The Chart of Accounting Principles (No. II) will be the same for all mining units and shows the principles necessary to be recognized in establishing the four working factors to express properly the condition and results of each business in costs and earnings.

Chart of Accounts.—A large percentage of business men and some accountants seem to think that names of accounts can be anything that the owner of the business may desire. This is the result, no doubt, of not establishing first a Chart of Principles. The names of accounts should clearly express the business operations and results according to principles, otherwise confusion and lack of clearness will ensue.

The Charts of Accounts shown (Nos. III, XI and XIV) would be applicable only to mines worked by means of shafts and drifts, and producing direct-smelting ores, which were being smelted by the company, and the metal contents being sold in the market. Such charts must be made to fit each individual business.

This can be done by taking the Chart of Principles (No. II) and dividing the accounting principles into Administrative, as shown by Chart II-*A*, and Operative, as shown by Chart II-*B*, and then determining the accounts necessary to properly and completely express the business results, as shown by Charts III, XI and XIV.

However, the accounts need not necessarily appear in the ledger in

the same order as on the Charts of Accounts, but in the order in which most convenient for posting and reference.

The Charts of Accounts must show the actual operating and administrative departments, sub-departments, etc., of the business, in order that a true picture of the results of operations may be made at set intervals. This is not a matter of personal opinion or desire as some think, but is a matter of clearly expressing facts.

Schedule of Charges and Credits.—The Schedule of Charges and Credits must state what shall be charged or credited to each operating- and administrative-department account, sub-department account, department-unit account, etc., in order to insure correctness and uniformity in the accounting, and to enable the determination of the true cost and the resulting profit or loss of each operation, as well as to fix definitely the responsibility of accurately reporting and recording charges and credits.

The reports of the Operating Department must show what was done, and when and where; and the Accounting Department must compile the operating charges and credits according to the schedules, otherwise a true and correct statement of operating results can not be obtained, and the usefulness of the reports of the Accounting Department to the Executive, the Manager and the Operating Officials will be impaired.

The uselessness of considerable of present-day accounting and costing is the direct result either of the heads of the Operating Departments determining how charges shall be made, the lack of a definite schedule of charges in the Accounting Department, or the inability of the Accounting Department, on account of insufficient authority given to it, to determine whether or not the reports of the operators are correct, which sometimes results in false, juggled or unintelligible accounting of little or no value to the Management or Operating Department Heads.

Differences in Mining Methods and Character of Mines.—The Charts of Accounts and Schedules of Charges must be made to fit the requirements of each class of mines, which may be stated, as follows:

As to Method of Mining:
- *A*-1. Mines being worked by means of shafts, drifts and stopes;
- 2. Mines being worked by surface pits with steam shovels or hand labor.

As to Character of Ores Mined:
- *B*-1. Mines producing direct-smelting ores;
- 2. Mines producing concentrating-metallic ores;
- 3. Mines producing concentrating-smelting ores; and
- 4. Mines producing leaching ores.

As to Method of Disposal of Products:
- *C*-1. Mines selling their products to smelters;
- 2. Mines smelting their ores and selling their smelter product to refineries or brokers; and
- 3. Mines smelting, refining and selling their products, and the product of other mines.

Necessarily there would need to be variations in the Chart of Operating Accounts to fit the operations of each class of mines, and differences to take care of the different minerals mined, as well as variations in the subsidiary accounts and the charges thereto of each mine of each class, in order to suit the local conditions and problems peculiar to each. Therefore, it can be readily seen that neither a Chart of Accounts, nor a Schedule of Charges could be drawn so as to be entirely applicable to all mines.

Forms and Procedure.—While the Administrative Accounting forms and procedure is practically uniform for all mines, the Operating forms and records and procedure must vary to suit the operating conditions of each mine. Nevertheless, where the accounting is based on principles, as shown by Chart II, the procedure and forms for each class of mines would be nearly uniform.

Only the more important forms have been shown in illustrating the accounting procedure. Of course, these forms would have to be changed to suit the peculiarities of each business, as most of the forms given herein are those applicable to copper mining.

The Administrative Accounting procedure should be practically the same for each mine, only the Operating procedure will vary according to the size and character of operations.

The General Operating procedure set forth in this work is that suitable for a metal mining business as illustrated by the Charts of Accounts. However, it must be understood that the Charts of Accounts, the Schedule of Charges, and the detail forms and procedure for operation must be made so as to fit each business and must change as the requirements of the business demand, otherwise the accounting system would not be in harmony with the operations of the business

ACCOUNTING DIVISIONS

While the Principles of Mine Accounting procedure follow one another in regular order as here-in-before set forth, and while the four working factors are generally worked out so as to make a complete consecutive whole, in actual practice the accounting work is generally divided into two divisions of:

1. Administration, and
2. Operation.

In order that the principles involved in each division of work may be known and followed, charts similar to Charts II-*A* and II-*B* must be drawn as a basis of the accounting of each division, and the proper charts of accounts established to conform to these principles as shown by Charts III and XI.

The work of each of these departments is complete and separate from the other. However, the summary of the operating results are closed into the Administrative Records at the end of each year or each period. While the principles of the Administrative and Operating Accounting are always as shown, in practise the division between Operating and Administrative Accounting may not be in accordance with theory, but to suit the desires of the Executive or requirements of the business.

STAGES OF OPERATION

During the development stage of mining the Administrative and Operating Accounting have to do with the capital receipts and capital investments in purchase, development and equipment of the property. During the production stage the Operating Accounting deals with the Operating Disbursements, Production, Sales, Receipts and Cash, while the Administrative Accounting takes care of the Capital and Administrative Disbursements, Receipts and Cash, the net results of the Operating Accounting and of the accounting of the Income, Dividends and Surplus and the drawing up of the Balance Sheet.

In the life of the average mine, we have two stages of operation of the property which must be accounted for, as follows:

1. Development, and
2. Production.

However, on account of the fact that practically all mining requiring an accounting department is done by corporate organizations, and the life of all successful mining corporations consists of four distinct periods of existence, there are two more stages added making four in all that must be accounted for, as follows:

Promotion and Organization of the Business,
Development and Equipment of Property,
Production of Property, and
Dissolution of the Business.

The accounting for each one of these periods is distinct and different from the others.

While the accounting required during the period of promotion and organization of the corporation when the necessary capital is raised with which to take care of the business, and the accounting for the development and equipment of the property when the capital that has been raised is invested in the business, is very simple, nevertheless it is very important, for, if the accounting during these periods does not properly show the capital that was paid in to the business, and does not properly account for the invested capital so as to meet the requirements of the Federal Tax Laws and the Treasury Department's Rulings governing the

determining of Income and Excess Profit Taxes, etc., the business may be compelled to pay excessive Federal Taxes, as soon as it is on a producing basis.

Both the Administrative and Operative Accounting required during the period of development has to do with the investment of the capital in property and equipment, while the accounting performed during the period of production is of entirely different nature and is highly important as intelligent and proper production accounting is absolutely necessary to obtain efficient operation and management, as well as to determine the true profit or loss resulting from each and every department, and of the business as a whole for each period of operations.

The accounting required upon the winding up of the business and dissolution of the corporation while necessary, also, is simple and, of course, final.

Therefore, in order to deal consecutively with accounting as it comes up in the course of the life of a business, there must be shown, first, the Administrative Accounting performed during promotion; second, the Administrative and Operative Accounting preliminary to production covering the investment of the capital in the purchase, development and equipment of the property; third, the Operating Accounting covering Production and the Administrative Accounting dealing with the results of production; and, fourth, the accounting necessary to close the business.

This will divide the accounting into four stages to take care of the four stages of business, as follows:

1. Promotion and Organization,
2. Development and Equipment,
3. Production and Investment,
4. Liquidation,

and will divide these four stages, except during Promotion and Organization when only Administrative Accounting is involved, into the two accounting divisions of:

1. Administration, and
2. Operation,

to properly account for like divisions of Operation.

SECTION 1

PROMOTION—DEVELOPMENT AND EQUIPMENT

CHAPTER III

CAPITAL

PROMOTION AND ORGANIZATION

The accounting required during Promotion has to do with obtaining capital, and while it is simple, it is the beginning of the accounting records and must be covered in order to make the records complete. All the accounting performed during the Promotion or Capital stage is performed by the Administrative Department.

Capital for Prospecting.—After a mining business has been established on a production basis, a certain amount of the earnings are used for prospecting of the property owned and the prospecting of promising properties owned by others who are unable to develop their ground, and who are willing to give an option for development and purchase of their property.

However, before a mining business can originate, mineral-bearing ground must be discovered and located in accordance with the Federal Laws governing the locating, holding and acquiring patent to Mineral Lands.

The prospecting for mineral-bearing ground is carried on generally by individuals acquainted with the practical side of mining and who are known as prospectors. This class of men obtain the necessary capital for prospecting by savings, or by grub stakes, or funds furnished by others who are to participate in anything discovered.

It is very seldom that these men ever develop their prospects, any more than what can be done by the yearly assessment work necessary to hold the located claim or claims.

After promising ground is discovered and located by the prospector, he endeavors to interest those who have sufficient capital either to develop the property for an interest, or to purchase it outright.

Upon the investment of capital to develop a prospect is the beginning of the mining business, which, on account of the hazardous nature and the large investment that is usually required to make a producer of a prospect, is generally carried on as an incorporated stock company.

Determining the Capitalization.—The first thing to be decided as to the formation of a stock company is the amount of capitalization. The capitalization of the company to be organized should be sufficient to take care of the amount specified in the Engineer's report as necessary to prove the property, plus an amount that will meet the terms of the

option for purchase of the property, as well as give a sufficient margin of reserve to take care of any reasonable unforeseen emergencis or difficulties.

Organizing the Business.—As a rule the initial company is a development company with a capital reasonably sufficient to prove the value of the property, and the company may become defunct upon the property proving a failure, or upon the proving of the property, it is absorbed by a mining company having a capital sufficient to take over the stock of the development company at its original investment value plus the additional value due to the results of the proving of the mine, and to take care of the equipment necessary to production, and to give ample working capital to carry on production operations.

After the amount of capital has been determined, the Articles of Incorporation drawn and filed, and Certificate of Incorporation has been received from the proper official of the State in which incorporated, a certified copy of the Articles are filed with the County Recorder of the County in which the business is to be done, and the accounting record of the origination of the business is made by an entry in the Journal (Form No. 1), as follows:

Capital Stock Unissued	$350,000.00	
To Capital Stock Authorized		$350,000.00

"Being the amount of capital stock authorized for sale by the Articles of Incorporation of the A. B. C. Development Co., and which is in the Treasury as unissued in all 35,000 shares at a par value of $10 per share."

The posting of this entry to the ledger Form No. 2 is the beginning of the accounting record and procedure.

Capital Receipts.—After the initial meeting of the stockholders electing the directors, etc., and the initial meeting of the directors electing the officers, the recording and the issuing of certificates of stock is done by the President and Secretary, for receipts of cash or its equivalent, and this is the beginning of the actual accounting of the business.

The record of the owners of the Paid in Capital of the company or business is kept by the Secretary of the company. Each owner of a share of the capital stock is given by the Secretary, a stock certificate, showing the amount of his share, the date issued, etc. Upon delivery of the stock certificate a receipt for same is taken from each owner and for record this receipt, showing the address, is filed in an alphabetical file and gives the Secretary a convenient record of the names and addresses of all owners of stock.

A record of the certificates of stock issued is kept on the credit side of the Capital Stock Journal (Form No. 3) as to date of issue, and this record is transferred to the credit side of each account in the Capital Stock Ledger (Form No. 4), which is kept so as to show the stock owned by each

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BISBEE, ARIZONA

DATE	✓ Posted		FOLIO	DEBIT	CREDIT

FORM 1.—Administrative Journal.

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ACCOUNT: _____

_____

DATE		FOLIO	DEB.T	CREDIT	DEBIT BALANCE	CREDIT BALANCE
	BALANCE FORWARD					
			BALANCE FORWARD			

FORM 2.—Administrative Ledger.

stockholder. The transfer of an original certificate to another party requires the cancellation of the original certificate and the issuance of a new certificate. Therefore, the cancelled certificate is entered on the debit side of the Capital Stock Journal and posted to the debit of the original owner, thereby closing out the record of his interest in the company, while the new certificate is credited to the new owner and recorded in the same manner as the original certificate.

The laws of most of the states require that there shall be a Registrar of the stock issued for protection of the stockholders. However, the

IN WHOSE NAME	CERTIFICATE ISSUED				Received the within described Certificate subject to the conditions of the Articles of Incorporation and By-Laws of the Company
	Ledger Folio	No. Certificate	No. Shares	Total No. Shares	

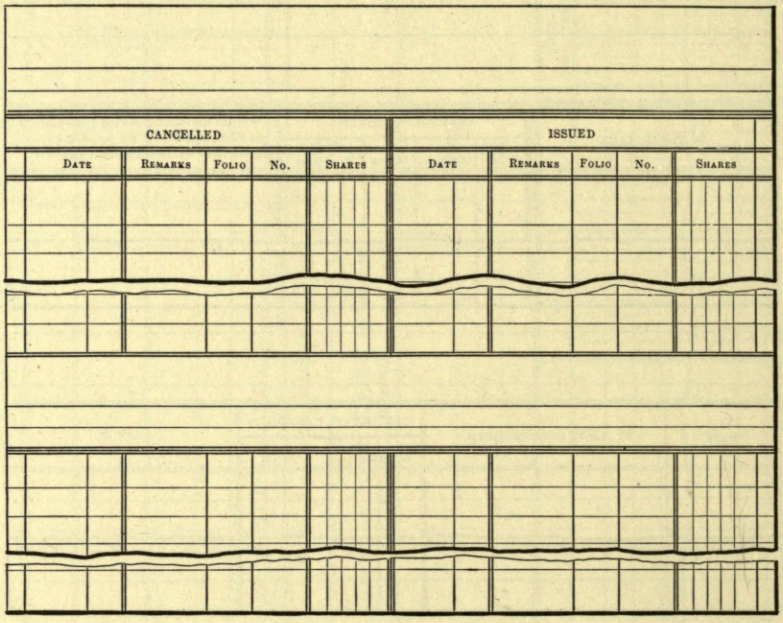
DATE	BY WHOM SURRENDERED	CERTIFICATE CANCELLED			LEFT BY
		Ledger Folio	No. Certificate	No. Shares	

FORM 3.—Capital Stock Journal.

Secretary is responsible for the record of the owners of the stock of the corporation, keeps the record (the Minute Book) of the deliberations and actions of the stockholders and of their representatives, the directors, and sees that the actions of the stockholders and directors are carried into execution. He is the business representative of the stockholders and the directors, and therefore his records have to do with the executive decisions as to what shall be done, and not with what has been done, which is the concern of the Treasurer and of the Accounting Department.

The Treasurer is the custodian of the cash and securities of the business and is the distributor and banker of the earnings, also, he usually keeps the accounting records of the capital invested in the business and the results of the operations in expense, receipts and earnings, unless there is a Comptroller, in which case such accounting records are usually kept in the Comptroller's office.

The distinction between the duties of the Treasurer's office and the Auditor's or Comptroller's office is rather indefinite in actual practice in most organizations. Theoretically the Treasurer is concerned only with cash, its receipt, the banking thereof, and its disbursement, and the securities in which the surplus of the business has been invested. In small companies the duties of the Secretary, Treasurer and Auditor or Comptroller, are usually combined under one head, known as the Secretary and Treasurer.



FORM 4.—Capital Stock Ledger.

As remittances are received from each subscriber for stock, a record is made by the Treasurer on the Debit side of the Administrative Cash Book (Form No. 5), crediting Capital Stock unissued, as follows:

May 1, 1904—Capital Stock Unissued..... $100,000.00
Remittance of John Smith for 10,000 shares of capital stock at par which has been issued to him by Certificate No. 1

Similar entries must be made for each remittance. Remittances for stock as shown by Cash Book must be posted to the ledger accounts, as follows:

Cash..... $100,000.00
Capital Stock Unissued..... $100,000.00

If a statement is made from the Ledger at any time before all the capital stock is issued the remaining debit balance, if any, in the ledger account

"Capital Stock Unissued" is never shown on the asset side of the Balance Sheet, but is aways shown as deducted from the credit account "Capital Stock Authorized," as follows:

Capital Stock Authorized	$350,000
Capital Stock Unissued	250,000
Capital Stock Issued	$100,000

Some times when a corporation is formed to take over the mine property of individuals, the mine property value agreed upon or a part thereof is paid for in stock at par.

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BISBEE, ARIZONA

DATE	RECEIPT VOUCHER NO.	EXPLANATION	FOLIO	CASH RECEIPTS		

TREASURER'S CASH FOR

MONTH OF

DATE	CHECK NO.	EXPLANATION	FOLIO	CASH DISBURSEMENTS		
				Bills Audited	Dividends	

FORM 5.—Administrative Cash Book.

When such a transaction is being planned an endeavor should be made to have the property owner give his check for stock for the amount agreed upon for the property, and then the company give its check to the property owner in payment of the property, thereby allowing the proper entries to be made in the Cash Book. In case neither party has sufficient cash to cover the transaction, one check can be held until the other is received which will result in one check being deposited to offset the payment of the other.

However, when an agreement has been entered into whereby the company is to deliver a certain number of shares of capital stock for mine or other porperty and the transaction is closed, it will be necessary to record the transfer by a Journal entry, as follows:

Property	$50,000.00	
To Capital Stock Unissued		$50,000.00

Five Thousand Shares of Capital Stock at par issued to John Smith in payment of 10 mining claims known as the Black Jack Group, as set forth in agreement between John Smith and A. B. C. Mining Co. dated May 1, 1904.

Capital Expense.—The acutal promotion expense is limited to the cost of organizing the business and advertising, and sale of stock. However, sometimes the promotion of the business is not completed until after development work at the property has been started. In which case the expense of the Secretary's and Treasurer's offices and the other expense of the administrative side of the business is part promotion and part development.

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TREASURER, BISBEE, ARIZONA

Voucher Number	PAID		FAVOR OF	AMOUNT	GENERAL		
	Check No.	Date			Operating Account	Treasurer's Office Exp.	Secretary's Office Expense

CHECK AND VOUCHER RECORD

Interest	DISTRIBUTION						REMARKS
	TAXES		TRANSFERS		ALL OTHER		
	Account	Amount	Account	Amount	Account	Amount	

FORM 6.—Administrative Voucher Record.

However, as all the Administrative expense incurred during both periods of promotion and development is closed at end of each year into the property account, it is not necessary to proportion the Administrative expense between Development and Promotion in cases where the Promotion period continues over into the Development period.

As a rule there is need for only the disbursement account, entitled Bills Audited, and three Administrative expense accounts during the promotion period, as follows:

Organization of Business,
Advertising and Sale of Stock, and
Administrative Expense.

Disbursements of cash to pay expense as set forth above are made upon vouchers that have been drawn showing the purpose of each disbursement.

The record of each cash disbursement is made in the Administrative Cash Book charging Bills Audited, and the record of the expense is made in the Administrative Voucher Record (Form No. 6). Posting is made from the summary of the Voucher Record to the Administrative Ledger, as follows:

Organization of Business	$ 585.00	
Advertising and Sale of Stock	3,545.00	
Administrative Expense	4,673.50	
To Bills Audited		$8,803.50

The posting from the Cash Book to General Ledger would be

Bills Audited	$8,803.50	
To Cash		$8,803.50

Statement of Condition of Business.—The period of promotion having ended a statement should be taken off the Ledger showing the condition of the business.

For example we will say that the business transacted during the promotion period was, as follows:

Sales of Capital Stock for Cash	$300,000.00
Sales of Capital Stock for Mine Property	50,000.00
Expense of Organization	585.00
Expense of Advertising and Sale of Stock	3,545.00
Expense of Administration	4,673.50
Final Payment of Mine Property in Cash	50,000.00

Therefore, a statement taken from the Ledger would show the condition of the business, as follows:

Debits:		*Credits*:	
Mine Property	$100,000.00	Capital Stock	$350,000.00
Organization of Business	585.00		
Advertising of Stock	3,545.00		
Administrative Expense	4,673.50		
Cash	241,196.50		
	$350,000.00		$350,000.00

However, as the expense items shown on the debit side of the statement were incurred in order to obtain the property these items should be closed at the end of the promotion period into the Mine Property Account in order to show the Mine Property Investment at its true cost, which is done by an entry in the Journal, as follows:

"Mine Property	$8,803.50	
To Organization of Business		$ 585.00
Advertising and Sale of Stock		3,545.00
Administrative Expense		4,673.50

Amount of the Promotion Expense incurred to raise the authorized capital to purchase and develop the mine property."

These entries being posted to the Ledger would give a statement showing that out of the $350,000 of stock sold $108,803.50 was invested in the property and $241,196.50 was in cash with which to develop and equip the property, as follows:

Mine Property	$108,803.50	Capital Stock	$350,000.00
Cash	241,196.50		
	$350,000.00		$350,000.00

CHAPTER IV

CAPITAL—DEVELOPMENT AND EQUIPMENT

The accounting performed during the initial development and equipment stage has to do with the investment of capital in the necessary development and equipment of the property, either to prove the mine or to bring it to the production stage. During the development stage the accounting is divided between the Operating and Administrative Departments.

Sufficient cash having been raised to take care of the property option of purchase and to carry out the initial development and equipment, an operating organization is formed to carry out the plans of initial development and equipment of the property.

Operating Organization.—In forming the operating organization someone is appointed to check out and account for the cash to be invested in development and equipment. During the initial stage of development at the property such a person is generally a bookkeeper who is responsible to the Treasurer. In the case of very small operations the Superintendent or Foreman in charge of the property simply makes reports of his disbursement liabilities and detail segregations of expense showing the proper distribution of the cash disbursements necessary to enable a proper accounting to be made by the Treasurer or the Administrative office as shown in the supplemental Chapter XXIV. However, on account of the fact that the Administrative Accounting Department is generally located at the corporate office of the company specified in the Articles of Incorporation where close touch can be maintained with the directors and officers of the company, but which is generally at such a distance from the property as to prevent intimate touch with operations, it is necessary that the accounting be divided, as soon as development operations become of any size, and an Operating Department be created with its head and its own bank and cash account.

Operating Accounting Department.—In order that the Operating Accounting may be kept separate from the Administrative Accounting necessary, monthly or periodical advances of cash are made by the Treasurer to the Operating Department. The receipt of these cash remittances are recorded in the Operating Cash Book and cash disbursements are made by the Operating Accounting Department to pay for materials and machinery purchased, and for wages and expense incurred in development operations.

As the accounting procedure as far as required during the development stage is the same as performed during the production stage, in order to avoid duplication, only sufficient accounting procedure will be given to illustrate the principles involved and to account for the administrative and operating expense which is considered as part of the investment in mine property.

Operating Accounting.—The operating accounting required during development is generally limited to the recording of the receipts of cash advanced by the Administrative Department, and the accounting of the disbursements of such cash in payment of labor, supplies and expense or bills audited as well as the segregating and analyzing of the disbursements so as to show the amounts invested in development, equipment and working assets.

The keeping of accurate records of each construction and equipment job is necessary in order that the requirements of the Income Tax Regulations governing deductions for depreciation and replacements may be met upon the property becoming a producer, as well as to enable an intelligent adjustment of insurance, in case of fire, etc.

Books of Record.—The bound books of record usually used during the development stage are the Operating Cash Book, Journal, Bills Audited Record, Check Register, and General Ledger. All other records such as Sub-ledgers, Time and Pay Rolls, Supply Issued Record, etc., are loose leaf and of the same form as required during the production stage.

General Accounts.—The general ledger accounts required during the development stage are, as follows:

1. Debit Accounts:
   Exploration and Development,
   Development Overhead,
   Operating Overhead,
   Accounts Receivable,
   Cash,
   Materials and Supplies,
   Construction and Equipment,
   Replacements.

2. Credit Accounts:
   Current Accounts Payable,
   Refunds and Discounts,
   Reserve for Accidents,
   Reserve for Depreciation,
   Treasurer.

3. Summary Closing Accounts:
   Mine Development Expense,
   Development Returns.

4. Operating Disbursement Accounts:
   Labor,
   Supplies,
   Bills Audited.

The department and sub-department accounts of each of the general development accounts and the charges and credits thereto are the same as shown in Operating Chart of Accounts No. III, and the Operating Schedule of Charges, except for Development Overhead, of which the detail accounts are the same as those shown for Ore Extraction.

Operating Disbursements and Receipts.—In order that there may be no duplication in the illustration of the accounting procedure as set forth under Production Accounting only the principles involved in Development Accounting will be demonstrated. Therefore, we will omit the detail technic and procedure which is illustrated under Production Accounting and assume the results of the Development period, as shown by Summaries of Ledger Accounts to be, as follows:

SUMMARY OF OPERATING TRANSACTIONS FOR PERIOD OF DEVELOPMENT OPERATIONS

Liabilities Incurred		
Labor Employed	$ 80,000.00	
Material and Supplies Purchased	70,000.00	
Expense Vouchers Audited	60,000.00	
Taxes Accrued	20,000.00	
Accident Insurance Accrued	10,000.00	
Refunds and Discounts	500.00	
Total	$240,500.00	
Cash Received and Disbursed		
Received from Treasurer	$240,000.00	
Received from Refunds and Discounts	500.00	$240,500.00
Disbursed to Liquidate Liabilities		195,000.00
Liabilities Liquidated		
Accounts Payable:		
Labor	$70,000.00	
Supplies	60,000.00	
Expense Vouchers	50,000.00	$180,000.00
Reserves Liquidated		
Reserve for Taxes	$10,000.00	
Reserve for Accidents	5,000.00	$ 15,000.00
Charges to Operations		
Labor	$80,000.00	
Supplies	50,000.00	
Expense Vouchers	60,000.00	
Taxes Accrued	20,000.00	
Accident Insurance Accrued	10,000.00	$220,000.00

All the above transactions having been accounted for according to principles of double entry bookkeeping, a statement from the General Ledger would appear, as follows:

Debits			*Credits*		
Cash		$ 45,500.00	Treasurer		$240,000.00
Materials and Supplies		20,000.00	Refunds and Discounts		500.00
Charges to Operations:			Reserve for Taxes		10,000.00
Labor	$80,000.00		Reserve for Accidents		5,000.00
Supplies	50,000.00		Accounts Payable:		
Expense	60,000.00		Labor	$10,000.00	
Taxes	20,000.00		Supplies	10,000.00	
Accidents	10,000.00	220,000.00	Expense	10,000.00	30,000.00
		$285,500.00			$285,500.00

While the above statement would probably satisfy the Treasurer as to the reality of disbursements for operations and would give an accounting statement of the condition of operations, such statement would be of little value to the one in charge of operations and to the Operating Department heads, nor does it give the necessary information as to what was invested in property development and what in construction and equipment, which information is absolutely necessary in order to properly account for results of operations.

Therefore, there must be created ledger accounts for Exploration and Development, Development Overhead and Operating Overhead, also an account for Construction and Equipment, and the charges to operation must be segregated and distributed to these general accounts and to each sub-department composing these general departments.

This will enable cost sheets to be compiled and furnished to the head of each department of operation, and allow an operating balance sheet to be drawn which will show the actual results of operations, as follows:

Debits		*Credits*	
Exploration and Development	$ 60,000.00	Accounts Payable	$ 30,000.00
Development Overhead	80,000.00	Reserve for Taxes	10,000.00
Operating Overhead	20,000.00	Reserve for Accidents	5,000.00
Construction and Equipment	60,000.00	Refunds and Discounts	500.00
Materials and Supplies	20,000.00	Treasurer	240,000.00
Cash	45,500.00		
	$285,500.00		$285,500.00

Determining the Net Mine Development.—It is necessary to put the operation results in the form above illustrated in order to make the accounting statement of value to the management and the stockholders.

However, at the end of each accounting period the net investment in Mine Development must be transferred to the Administrative Records in order that the Administrative Department may have the record of the

net property investment for the period ended and in order that the operating records for the new period contain only the information applicable to each operating period.

Therefore, a closing account entitled Mine Development is created and the amounts of the period's charges to the development accounts of Exploration and Development, Development Overhead, and Operating Overhead are charged into this Mine Development Account, and the amount of the period's credits of Refunds and Discounts, etc., is credited to this account, the balance of which is the net investment in Mine Development without depreciation.

Depreciation of Development Equipment.—It is evident that the mine development investment should include a certain amount of Depreciation of Equipment as the life of the equipment is being shortened by operations and also as a rule considerable of the development equipment must be replaced as soon as the property becomes a producer. For these reasons the estimated life of the development equipment is determined to be usually from three to five years, and a proportionate amount of the equipment investment written off as depreciation by creating a reserve for depreciation, as follows:

Depreciation	$12,000.00	
To Reserve for Depreciation		$12,000.00

One-fifth of the total investment in mine equipment considered depreciated by the year's operations.

The amount of this depreciation charge is then closed to Mine Development and the balance of the Mine Development Account represents the net investment in mine development for the period.

Statement of Development Operations Before Closing to Treasurer's Account.—A statement taken from the Development General Ledger after the above adjustments have been made, would show the condition of Development operations, as follows:

STATEMENT OF DEVELOPMENT OPERATIONS AT CLOSE OF YEAR BEFORE CLOSING TO TREASURER

Mine Development	$179,500.00	Accounts Payable	$ 30,000.00
Construction and Equipment	60,000.00	Reserve for Taxes	10,000.00
Materials and Supplies	20,000.00	Reserve for Depreciation	20,000.00
Cash	45,500.00	Reserve for Accidents	5,000.00
		Treasurer	240,000.00
	$305,000.00		$305,000.00

Closing Mine Development Investment to Treasurer.—A copy of the condition of development operations taken from the ledger, as shown by the above statement, is delivered to the Treasurer and the amount of the Mine Development which is to be transferred to the Administrative

records is charged to the Treasurer on the Operating Books by entry, as follows:

Treasurer	$179,500.00	
To Mine Development		$179,500.00

Amount of investment in mine development during year 1908 transferred to Treasurer's records.

The transfer of the Mine Development investment for the period to the Treasurer leaves the operating records clear for the new period, as shown by the following statement:

STATEMENT OF DEVELOPMENT OPERATIONS ON JANUARY 1, 1909, AFTER CLOSING FOR YEAR

Construction and Equipment	$ 60,000.00	Reserve for Depreciation	$ 20,000.00
Materials and Supplies	20,000.00	Reserve for Taxes	10,000.00
Cash	45,500.00	Reserve for Accidents	5,000.00
		Accounts Payable	30,000.00
		Treasurer	60,500.00
	$125,500.00		$125,500.00

The investment in Construction and Equipment is not transferred to the Treasurer as this investment along with the reserve for depreciation must be carried on the Operating Books, in order that the proper charges for replacements of equipment may be made against the depreciation reserve.

Administrative Accounting.—The head of the Administrative Accounting Department during the development stage of a mining venture is generally the Treasurer and the Administrative Accounting is done by accountants, bookkeepers or clerks, under his direction. The personnel of the department depending, of course, on the volume of business.

Statement of Business at Beginning of Development.—At the close of promotion and beginning of development, the statement of the condition of the business, as shown by Treasurer's books was, as follows:

Mine Property	$108,803.50	Capital Stock	$350,000.00
Cash	241,196.50		
	$350,000.00		$350,000.00

We will assume the summary of the administrative business transacted during the development period was, as follows:

Cash Advanced to Operations	$240,000.00
Treasurer's Office Expense	2,600.00
Secretary's Office Expense	1,800.00
Legal Fees and Expense	1,750.00
Cash Borrowed by Note	10,000.00
Interest on Note for Six Months at 6 Per Cent	300.00

These transactions having been recorded and accounted for in accordance with the principles of double entry bookkeeping, and the accounting procedure outlined under Production Accounting would give a statement from the Treasurer's books, as follows:

STATEMENT OF ADMINISTRATIVE OPERATIONS AT END OF DEVELOPMENT PERIOD BEFORE ADJUSTING ACCOUNTS

Mine Property	$108,803.50	Capital Stock	$350,000.00
Cash	4,746.50	Notes Payable	10,000.00
Treasurer's Office Expense	2,600.00		
Secretary's Office Expense	1,800.00		
Legal Fees and Expense	1,750.00		
Interest Paid	300.00		
Operating Account	240,000.00		
	$360,000.00		$360,000.00

Administrative Mine Development.—The Administrative investment in Mine Development is the amount of the Administrative expense during the development period. In order to show this investment for the period a ledger account is created and named General Development, and the amount of the Administrative expense is closed into it, as follows:

General Development	$6,450.00	
To Treasurer's Office Expense		$2,600.00
Secretary's Office Expense		1,800.00
Legal Fees and Expense		1,750.00
Interest		300.00

Closing the Administrative Expense for Mine Development during year 1908 into General Development Account.

Crediting Operations with Mine Development.—The amount of the Mine Development for the period as shown by the Operating Ledger and which was charged to the Treasurer on the Operating Books must be taken up on the Administrative Books and the Operating Account credited. This is done by a journal entry for posting to the Ledger, as follows:

Mine Development	$179,500.00	
To Operating Account		$179,500.00

Amount of Mine Development for year ending 12–31–08 as shown by Operating Statement for year 1908.

The records now are in condition to give a statement of Administrative Operations at end of the development period after adjusting accounts, as follows:

Mine Property	$108,803.50	Capital Stock	$350,000.00
Mine Development	179,500.00	Notes Payable	10,000.00
General Development	6,450.00		
Cash	4,746.50		
Operating Account	60,500.00		
	$360,000.00		$360,000.00

This gives the condition of the Administrative end of the business in the necessary form before absorbing the results of the Operating Department.

In order to make a complete statement of the business it is necessary to enter in the Administrative Journal the debit and credit balances of the Operating Ledger, as shown by the Statement of Development Operations on January 1, 1909, after closing for year.

Having entered these debit and credit balances on the Administrative Journal and opened up accounts in the Administrative Ledger to take care of the operating debits and credits, except the balance of the Treasurer's Account which is credited to the Operating Account in the Administrative Ledger, would show the condition of the business, as follows:

STATEMENT OF THE CONDITION OF THE A. B. C. MINING COMPANY AS OF DECEMBER 31, 1908

Mine Property		$108,803.50	Capital Stock		$350,000.00
Mine Development		179,500.00	Notes Payable		10,000.00
General Development		6,450.00	Accounts Payable		30,000.00
Construction and Equipment		60,000.00	Reserve for Taxes		10,000.00
Materials and Supplies		20,000.00	Reserve for Accidents		5,000.00
Cash		50,246.50	Reserve for Depreciation		20,000.00
Mine	$45,500.00				
Treasurer	4,746.50				
		$425,000.00			$425,000.00

The Development Stage.—A mine is in the development stage as long as the net returns from ore shipments, plus the net value of the ore in the mine, is equal to or is less than the investment in property equipment and development. Some mines never get beyond the development stage, and the ore that is encountered in development operations is shipped as long as the net return is in excess of the transportation, smelting and selling costs, or as long as it gives a return in excess of the actual development expense that would be incurred in case no ore shipments were made.

While a mine in the development stage may not, especially where its ore deposits are proven by diamond or churn drilling, have any production during the development stage, nevertheless it is more often the case that the development work when done by shafts, drifts and tunnels produces a certain amount of ore which, if it will give a small profit above the expense after leaving the mine, is shipped. Also, in most cases all ore in place that will bring a profit after it leaves the mine, sufficient to pay for its extraction and leave a surplus with which to carry on exploration and development in barren ground, is generally mined during the development stage in order to make the mine pay for its development with as little expenditure of the original investment as

possible, which may be conserved for equipment, etc., upon the mine being proven.

Development Production Accounting.—When production is carried on by a mine in the development stage the production and expense accounts necessary to properly account for Mine and Smelter Production, Sales of Metals and Receipts from Sales, as shown on the Schedule of Accounts, 3 and 11, will have to be created and carried in the ledger, and the accounting procedure followed as shown in Production Accounting.

At the end of the development period or year in order to determine whether or not a profit or loss resulted from production, the production expense accounts and the production credit accounts are closed into the Development Returns Account, as follows:

DEVELOPMENT RETURNS ACCOUNT

Credits

Copper Sales Deliveries	$50,525.00	
Ore and Bullion on Hand	22,690.00	
Gold and Silver Sales	2,875.00	
Gross Development Returns		$76,090.00

Debits

Ore Transportation	$ 1,009.00	
Smelting	15,425.00	
Bullion Freight and Refining	7,640.00	
Selling	1,001.00	
Total Development Production Expense		$25,075.00
Net Development Returns		$51,015.00

Whatever profit is obtained from the development production, as shown by the Development Returns Account is credited to the Mine Development Account, thereby closing out the Development Returns Account.

On account of all operating cash receipts, except for refunds and discounts, being advances by the Treasurer, it is necessary that the production receipts as received by the Treasurer be entered in the Administrative Cash Book crediting the Operating Department as follows.

Cash	$50,525.00	
To Operating Account		$50,525.00
Proceeds of Sales Nos. 1 to 15 of copper.		

The Operating Journal entry to make the necessary record on its books to cover the amount received by the Treasurer for the Operating Account would be:

Treasurer	$50,525.00	
To Due for Copper Shipped		$50,525.00
Amount of cash received by the Treasurer for sales of copper Nos. 1 to 15 inc.		

CHAPTER V

CAPITAL—REORGANIZATION OF DEVELOPMENT

When a development company has been organized to carry on the exploration and development of a mine property, such company, upon the property being proven to be a mine, is generally superceded by a mining company with a capital sufficient to take up the stock of the development company at its proved value and to install all needed improvements and additions to equip and to give the necessary working capital that will be required to carry on production.

Determining the Capitalization.—At this time the value of the mine property must be determined by competent engineers and geologists in accordance with regulations of the Treasury Department governing discovery value, and if such value is in excess of the actual investment the additional value may be capitalized. On account of the present Federal Tax Law the obtaining of the proper amount of capitalization is very important.

The accountant should be familiar with the Federal Tax Laws and the Treasury Department's requirements and should work in close conjunction with the engineer and examine his estimates to see that they meet the requirements of the federal tax law as well as take advantage of the privileges that the State and County Tax Laws allow.

Before taking the Engineer's estimated value of the mine property upon the books, the accountant should examine the estimate carefully to see that it contains in proper form information, as follows:

(*a*) The total dry tonnage of proven and probable commercial ore that has been discovered.

(*b*) The commercial mineral contents of discovered ore.

(*c*) The recoverable and marketable contents of the ore.

(*d*) The cost of recovery and of marketing the recoverable contents.

(*e*) The prices to be received for the recoverable contents.

(*f*) The time required to mine and market the ore.

(*g*) The rate of interest to be allowed in determining the present worth of the mine as of any certain date.

The last two factors should be in accord with the tables published by H. D. Hoskold, which are acceptable to the Federal Government.

Another important matter to be determined is the amount of additional capital that will be necessary to take care of new equipment and

furnish working capital for production operations. This must be such as to meet the requirements of each individual case. However, we will assume that in this instance the facts are, as follows:

Additional Value of Mine Property	$1,050,000.00
Additional Equipment Necessary	350,000.00
Additional Working Capital Necessary	350,000.00
Additional Emergency Capital Desired	350,000.00
Additional Capital Necessary	$2,110,000.00
Development Capital	350,000.00
Necessary Capitalization of Mining Company	$2,450,000.00

This would require that the mining company have a capitalization of seven times the amount of the development company.

In case the par value of the stock were to be the same, the mining company would need seven times the number of shares of stock of which one-seventh would be required to take up the stock of the development company, three-sevenths to take up the additional value of the mine property, and three-sevenths of the shares to be sold to the stockholders for cash to furnish the capital to take care of additional equipment and working capital necessary for production.

Therefore, each stockholder of the development company would receive upon the surrender of his development stock four shares of mining stock for each share of development stock owned, and would be allowed to subscribe for three additional shares of mining stock at par.

Reorganization Accounting.—After the legal procedure of the reorganization has been completed the record of the change from the development company to the mining company must be made.

At this time a new set of general books in which to record the transactions of the new company are advisable, although it is not necessary. However, there must be a new set of stock records.

In either case it is necessary to record the new capitalization upon the books which are to be used, as follows:

UNISSUED CAPITAL STOCK		
A. B. C. Mining Co.	$2,450,000.00	
TO CAPITAL STOCK AUTHORIZED		
A. B. C. Mining Co.		$2,450,000.00

The amount of the capitalization of the A. B. C. Mining Co. which is to absorb the A. B. C. Development Co., as per resolutions of the stockholders of the A. B. C. Development Co., adopted at meeting held November 5, 1905, and as per amended Articles of Incorporation dated December 15, 1905.

As the stockholders of the development company surrender their stock in exchange for shares of mining company stock, at ratio of one for four, entries would be made closing out the Development Capital Stock Account and charging additional value Mine Property Account, so that

when all the development stock had been exchanged the total charges and credits would be, as follows:

A. B. C. Development Stock	$ 350,000.00	
Additional Value Mine Property	1,050,000.00	
To Unissued Capital Stock A. B. C. Mining Co.		$1,400,000.00

Also as the rights of each of the shares of the development stock are exercised to subscribe for three shares of mining stock at par, entries must be made to close out the unsubscribed mining stock giving total charges and credits when all stock has been subscribed as follows:

Cash	$1,050,000.00	
To Unissued Capital Stock		$1,050,000.00

This would close out the unissued capital stock of the mining company and complete the record of the reorganization of the development company.

Condition of Business After Reorganization.—A statement taken from the Administrative Ledger after reorganization would appear, as follows:

Mine Property	$1,158,803.50
Mine Development	179,500.00
General Development	6,450.00
Cash	1,054,746.50
Operating Account	60,500.00
	$2,460,000.00
Capital Stock	$2,450,000.00
Notes Payable	10,000.00
	$2,460,000.00

while a statement taken from the Operating Ledger would be, as follows:

Statement of Operating Ledger After Reorganization

Construction and Equipment	$ 60,000.00
Materials and Supplies	20,000.00
Cash	45,500.00
	$125,500.00
Reserve for Depreciation	$ 20,000.00
Reserve for Taxes	10,000.00
Reserve for Accidents	5,000.00
Accounts Payable	30,000.00
Treasurer	60,500.00
	$125,500.00

and a combined statement showing the condition of the business would be, as follows:

STATEMENT OF CONDITION OF A. B. C. MINING CO. AFTER REORGANIZATION

Mine Property	$1,158,803.50	Capital Stock	$2,450,000.00
Mine Development	179,500.00	Notes Payable	10,000.00
General Development	6,450.00	Accounts Payable	30,000.00
Construction and Equipment	60,000.00	Reserve for Taxes	10,000.00
Materials and Supplies	20,000.00	Reserve for Accidents	5,000.00
Cash	1,100,246.50	Reserve for Depreciation	20,000.00
Mine $ 45,500.00			
Treas. 1,054,746.50			
	$2,525,000.00		$2,525,000.00

This takes care of all the accounting matters of importance preceding production, that are not covered under Production Accounting.

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SECTION 2

OPERATING PRODUCTION

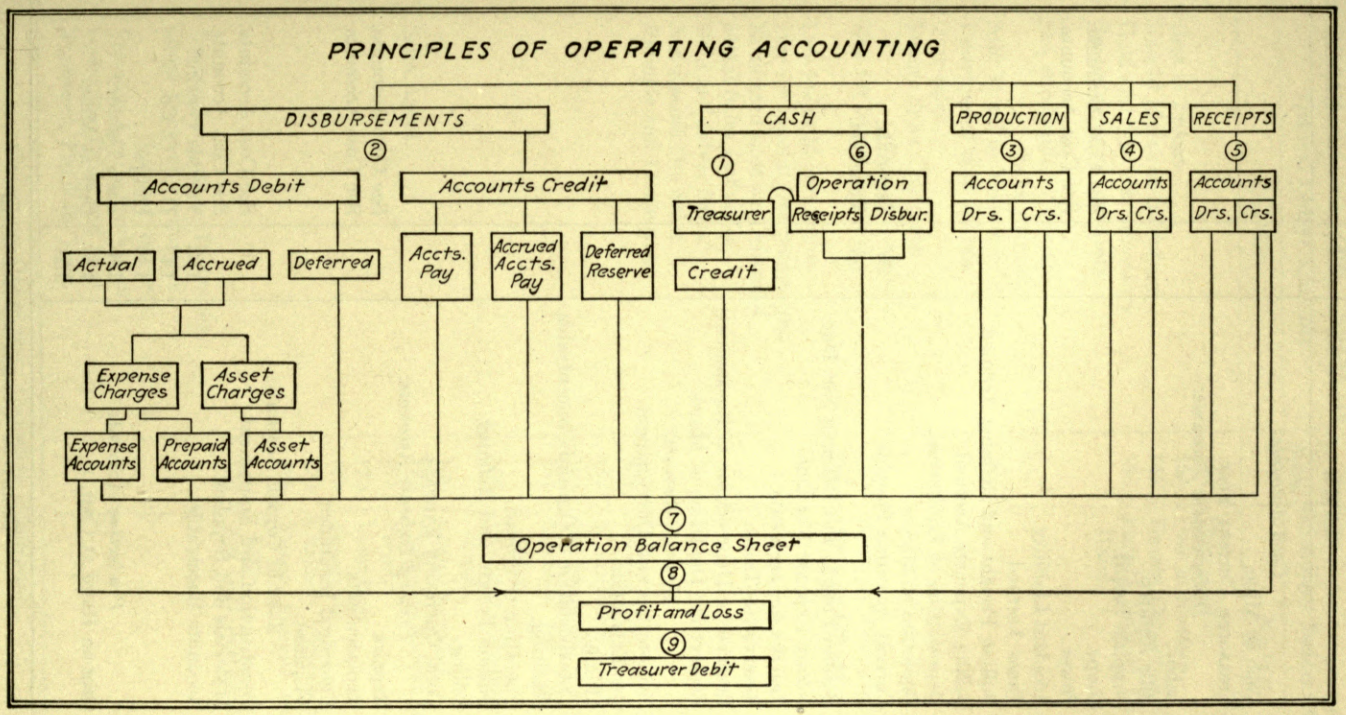

PRINCIPLES OF OPERATING ACCOUNTING
DISBURSEMENTS
2
CASH
1
6
PRODUCTION
3
SALES
4
RECEIPTS
5
Accounts Debit
Accounts Credit
Treasurer
Operation
Receipts
Disbur.
Accounts
Drs.
Crs.
Accounts
Drs.
Crs.
Accounts
Drs.
Crs.
Actual
Accrued
Deferred
Accts. Pay
Accrued Accts. Pay
Deferred Reserve
Credit
Expense Charges
Asset Charges
Expense Accounts
Prepaid Accounts
Asset Accounts
7
Operation Balance Sheet
8
Profit and Loss
9
Treasurer Debit

CHART II-*A*.

Acct. No.	General Ledger Accounts NAME	Acct. No.	Subsidiary Ledger Accounts NAME
	Cash Accounts:		
1	Cash at Mine.		
2	Treasurer, Current Year.		
	Disbursement Accounts:		
3	Labor.		
4	Bills Audited.		
5	Supplies Issued.		
6	Shops.		See Cost Accounts.
7	Power.		See Cost Accounts.
#	Accident Liability.		
#	Taxes Accrued.		
#	Bullion Freight and Refining Accrued.		
#	Selling Expenses Accrued.		
8	Depreciation of Equipment.		
9	Depletion of Mines.		
10	Current Accounts Payable.	57	Pay-rolls.
		58	Vouchers.
11	Bullion Freight and Refining Not Due.		
12	Selling Expense Not Due.		
13	Reserve for Accidents.		
14	Reserve for Taxes.		
15	Reserve for Depreciation of Equipment.		
16	Reserve for Depletion of Mines.		
	Expense Accounts:		
17	Exploration and Development.		
18	Ore Extraction.		
19	Milling.		
20	Transportation of Ore and Concentrates.		
21	Smelting.		
22	Operating Overhead.		
23	Bullion Freight and Refining.....		
24	Selling.		
25	Total Operating Expense.		
	Prepaid Expense Accounts:		
26	Repairs.		See Cost Accounts.
27	Replacements.		See Cost Accounts.
28	Unexpired Insurance.		
29	Suspense.		
	Asset or Capital Accounts:		
30	Construction and Equipment.		See Cost Accounts.
31	Materials and Supplies.		See Cost Accounts.
32	Accounts Receivable.	142	Various Persons.
		143	D. A. C. Co.
		144	Lamps.
	Production Accounts	145	Each Debtor.
	Ores on Hand at Cost.	153	Ores at Mine.
33		154	

CHART OF OPERATING ACCOUNTS

CHART III

CHART OF OPERATING ACCOUNTS

CHART III

Acct. No.	General Ledger Accounts NAME	Acct. No.	Subsidiary Ledger Accounts NAME
		154	Ores at Mill.
34	Ores in Process.	155	Ores at Smelter.
35	Unsold Metal at Inventory.	157	Unsold Copper in Transit.
35-*A*	Gold and Silver at Inventory.	158	Unsold Refined Copper on Hand.
35-*B*	Special Ores at Inventory.		
36	Ore and Bullion Account.		
	Sales Accounts:		
37	Sold Metal in Transit.		
38	Undelivered Sold Metal.		
39	Over-sales.		
40	Future Sales Contracts.		
	Receipt Accounts:		
41	Due for Metal Shipped.	159	Monthly Sales Deliveries.
		160	Overs and Shorts.
41-*A*	Due for Gold and Silver.		
41-*B*	Due for Special Ore Shipments.		
42	Estimated Loss on Deliveries.		
43	Metal Sales Deliveries.		
43-*A*	Gold and Silver Sales.		
43-*B*	Net Special Ore Sales.		
44	Refunds and Discounts.		
		161	Freight Refunds.
		162	Miscellaneous Refunds.
		163	Old Material Sales.
		164	Uncalled for Checks Cancelled.
		165	Pay-roll Deduction Discounts.
		166	Cash Discounts.
45	Sales Agent.	170	Commissions and Telegrams.
		171	Freight.
		172	Insurance.
		173	Discounts.
		174	Cathode Allowances.
		175	Excess Freight and Insurance.
		176	Net Cash Settlements.
46	Reserve for Loss on Deliveries.		
47	Gross Value of Production.		
	General Accounts:		
48	Previous Year's Production.		
49	Operating Profit and Loss.		
50	Treasurer, Previous Year.		

CHAPTER VI

OPERATING GENERAL ACCOUNTING

PRODUCTION

The mining operations having progressed from the capital to the production stage, the accounting must necessarily be expanded and made to express the production results in costs and earnings, etc.

As the production operations are divided into Operation and Administration, the General Accounting of necessity must be divided likewise, and as the principal concern of Administrative Accounting is the result of operations, disposition will be made first of Operating Accounting.

BASIS OF ACCOUNTING

Before taking up the Operating Accounting it is first necessary to determine upon what basis the records are to be kept, that is whether on an accrued or cash basis.

If the business is of such size as to require an accounting department, the records should be kept upon an accrued basis in order that complete and accurate costs and earnings can be obtained, and that the accounting records may give an accurate history of the business transactions which can not be obtained when the records are kept on a cash basis.

It has been generally accepted that the accrued basis of accounting is most satisfactory and desirable in mining, and, therefore, the accounting illustrations to follow will be upon the accrued basis.

Upon such a basis the disbursement liabilities and the receipts are taken up on the books when created regardless of whether or not they have been liquidated by cash disbursements or cash receipts.

When the basis of accounting has not been determined beforehand part of the accounting may be kept on an accrued basis and part on a cash basis which does not give satisfactory records or results and may result in the payment of unnecessary federal taxes should the tax rate be changed.

OPERATING PRODUCTION ACCOUNTING

The Operating Accounting Department takes the cash furnished by the Administrative Department and shows it as it is invested in materials, machinery and wages for men with which the property is developed and equipped and the product is produced, sold and converted back again into cash which is delivered to the Administrative Department to carry on future operations, part to the stockholders as dividends from earnings,

part as Depletion and Depreciation Reserves, or as Capital Returned Dividends, and part to Surplus as a reserve to take care of enlarged business demands and emergencies or for investments, all of which is illustrated by Charts II and II-A.

The operating accounting system must, in addition to being built upon the principles underlying the business, be based upon the unit principle so as to be sufficiently flexible, without interfering with the integrity of the system, both to allow of the expansion necessary to take care of natural or unnatural growth of the business and the contraction caused by depletion, change of operating methods, or demoralization of the metal markets, as well as to be sufficiently fixed, as to general form to allow of comparative statements being made.

Therefore, having determined the fundamental principles of accounting procedure, as here-in-before set forth in Chapter II and having in mind the purpose so to record the transactions and operations of the business as to obtain a true and intelligent statement of the condition of the business and the results of operations in costs and earnings, the head of the Operating Accounting Department must be the one to determine and to direct the accounting and costing of a mining organization, if uniform and efficient results are to be obtained, and not the operating departmental officials who are usually engrossed in the details of production and imbued with the desire of showing each department in the best possible light.

DIVISIONS OF PRODUCTION ACCOUNTING

The Operating Accounting of mining production operations can be more readily explained if divided into:

I. General Accounting,
II. Cost Accounting and Statistics,
III. Economic Accounting.

The Operating General Accounting required during the Capital Stage of development of the property is concerned with the recording of:

1. Receipts from Treasurer,
2. Disbursements for Development,
3. Disbursements for Construction and Equipment,

so as to show that part of the capital invested in fixed assets, of property, its development and equipment. However, the Operating Accounting performed during production has to do with that part of capital invested as working capital in its five stages of:

1. Disbursements,
2. Production,
3. Sales,
4. Receipts,
5. Cash,

as shown by Chart II-*A*; also with the segregating and arranging of disbursements so as to allow of proper costing, and the detailing of Production, Sales, Receipts and Cash, so as to show at regular periods the resulting profit or loss and the true condition of operations.

Cost Accounting is the analyzing of the expense chargeable to the Profit and Loss Account so as to enable the determination of the profit or loss of each product for each division, department or item of the business.

Operating Costing is the showing, for each period of operations, the cost of each element, class or item of expense for each product per production or operation unit, for each department, sub-department, department unit or sub-department unit, so as to guide and assist the manager and each department head to ascertain whether or not efficiency is being obtained in the operations.

Cost Accounting will be dealt with separately after the disposal of Accounting.

Economic Accounting is the recording, analyzing and compiling of production and cost factors so as to show production losses and the best economic results at different production prices, costs and recoveries.

All the Operating Accounting and Costing should be subject to the supervision and direction of the head of the Accounting Department. The accounting necessary for each operating or production department should be considered as a separate branch or department of the Accounting Department, and be under the direct supervision of an accountant who is directly responsible to the head of the Accounting Department.

OPERATING CAPITAL

Production operations require sufficient working capital in the form of cash to take care of operating expenses during the time the product is produced and until it is sold and payments received therefor, also with which to purchase and carry in stock sufficient supplies to enable continued and efficient operation.

To furnish this capital to operation, advances of cash are made by the Treasurer each month or at intervals, the same as in the development stage.

STATEMENT AT BEGINNING OF PRODUCTION

As there is generally a certain amount of production during the development stage before the mine is proven, during which advances of cash are made to the operating department, and certain production accounts are created, we will assume that during this period there was advanced to the Operating Department $873,111.77, and that the Administrative Ledger would show cash as that much less, and Operating

Account that much more, and that a statement taken from the Operating Ledger at the beginning of Production Operations would be, as follows:

STATEMENT FROM OPERATING LEDGER AT BEGINNING OF PRODUCTION

Debit Balances		
Cash		$ 222,174.43
Accounts Receivable		4,862.15
Sold Copper in Transit		641,617.92
Due for Copper Shipped	$159,265.83	
Sales Agent	64,555.93	94,709.90
Due for Gold and Silver		6,719.69
Ores on Hand at Cost		7,352.25
Development Production		648,970.17
Suspense		220.00
Materials and Supplies		133,886.59
Construction and Equipment	$285,466.62	
Replacements	1,767.22	287,233.84
		$2,047,746.94
Credit Balances		
Ore and Bullion	$ 7,352.25	
Future Sales	641,617.92	$648,970.17
Accounts Payable		110,147.03
Bullion, Freight and Refining Not Due		35,809.13
Selling Not Due		8,580.32
Reserve for Accidents		42,349.13
Reserve for Taxes		42,449.52
Reserve for Depreciation		225,829.87
Treasurer		933,611.77
		$2,047,746.94

The mine having entered the production stage, all operating expense, including the exploration and development that is continued along with ore extraction, is chargeable against production.

OPERATING EXPLORATION AND DEVELOPMENT

During the production stage it is customary to charge all expense for exploring the ground covered by the Property Account, as well as all expense for developing proven territory, to the cost of current production.

Therefore, the operating exploration and development work is considered one of the departments of production expense. However, if exploration work is done on properties under option or on new properties not yet proven, it is charged to a separate account and treated as property investment the same as was done during the development stage of the original property.

The amount of development expense is usually limited to a certain figure per ton of ore mined, or a certain number of feet per ton of ore mined, and this limit is not consistently exceeded unless authority has been granted the mine department so to do.

After a mine has entered the production stage, and for some reason discontinues production but continues development, the amount of development may be changed either to the profit and loss or surplus account, or it may be set up as a Deferred Disbursement, or a Prepaid Expense and apportioned to production expense after production has been resumed in the future, and report of such disbursements may be so made in making returns for federal income tax.

CAPITAL DISBURSEMENTS DURING PRODUCTION

The only capital disbursements made by the Operating Department when a property has entered the production stage are for new equipment and replacements of old equipment. However, no such disbursements are made, except within certain limits, or in case of emergencies, except upon the authority of the board of directors. Also, as a rule, each department head is limited in the amount of such expenditures that he may authorize without first obtaining the approval of the general manager.

All other capital expenditures, such as investments, purchase of other properties and equipment and development of other properties are made either by the Administrative Department, or by one authorized so to do, and are kept separate from regular equipment and development disbursements for the producing property.

CHART OF OPERATING PRINCIPLES

As a guide and to insure completeness and uniformity in the Operating Accounting a chart should be drawn to show the principles involved in operating accounting.

This chart would not be complete for the business but would illustrate only those principles underlying the accounting of the Operating Department which is concerned only with Operating Cash, Disbursements, Production Sales and Receipts, the Operating Balance Sheet, the Operating Profit and Loss Account and the connecting account with the Administrative Accounting shown, as a rule, on the operating books as Treasurer.

Such a chart of principles is shown by Chart II-*A*.

WORKING FACTORS

Having established the Chart of Operating Principles it is then necessary to create Charts of Operating Accounts in conformity with these principles that will properly record the activities of the different departments of operation. Such a chart is shown in Chart III of Operating Accounts. This chart must be worked out so as to give sufficient operation information and act as control accounts for the Chart of Cost

Accounts which is generally created at the same time, and will be illustrated under Cost Accounting.

The Chart of Operating Accounts having been established there must be determined a Schedule of Charges and Credits that are to be made to these accounts in order to insure uniformity and accuracy in the compiling of the data of business and operating activity. Such a chart must be made to meet the needs of each business.

Upon having determined the chart of accounts and schedule of charges in conformity with the principles, it is then necessary to outline the accounting procedure and to create forms on which the information is to be reported to, and on which it is to be recorded in the accounting office.

The nature of this procedure and the character of these forms will be illustrated in the following chapters, but, of course, will vary to meet the requirements of each business.

OPERATING DISBURSEMENTS

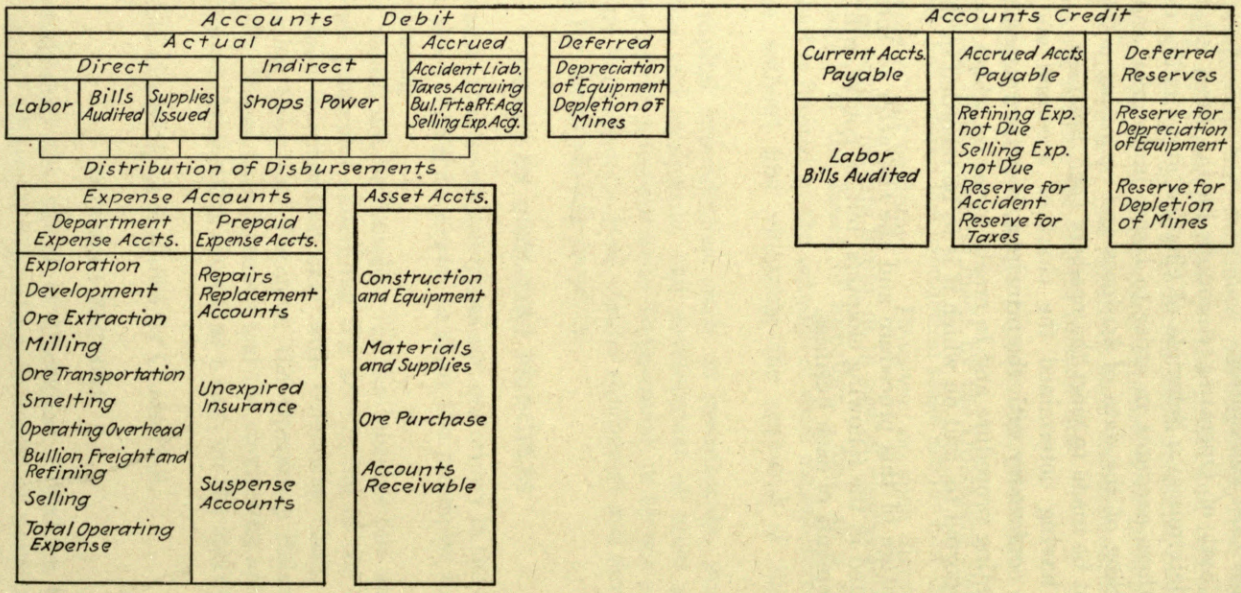


CHART IV.

CHAPTER VII

OPERATING DISBURSEMENTS

The Operating Disbursements of production consist of Current or Actual, Accrued and Deferred, segregated so as to provide for proper accounting and costing, as shown by Chart IV. It is necessary that a complete record shall be made of all actual disbursements, and that this record shall be such as will allow a ready and reliable check to be obtained at the end of each accounting period by the one in charge of the Accounting Department, or by outside auditors, of all operating and cash disbursements.

The business of Mining requires, in addition to the disbursements of Cash to meet the liabilities of operations, the direct disbursement or application to operations, first, of Labor as shown by the pay-rolls, and second, of Expense as shown by the Bill of Expense entered in the Bills Audited Record, and third, of Materials and Supplies to operations, as shown by the Supplies Issued Record. Therefore, it is necessary, in order to allow a ready and accurate check to be made of all actual disbursements, that there be created and maintained Direct Disbursement Accounts, as shown by Chart VI, as follows:

LABOR
BILLS AUDITED
SUPPLIES ISSUED

The Supplies Issued Account is supported by the Supplies Issued Record and the signed charge tickets which enable an accurate and ready check to be made of all disbursements from the Stores of Materials and Supplies, while the Labor and Bills Audited Accounts are supported, respectively by the pay-rolls, with the signed statements, and the Bills Audited Record with the receipted vouchers, and enable an accurate and ready check to be obtained of all Cash Disbursements for Labor, Expense and Purchases.

These three Direct Disbursement Accounts cover all actual Operating Disbursements. The Indirect Disbursement Accounts are Power and Shops and are sub-divisions of the Direct Disbursement Accounts.

However, as the records are to be kept upon an accrued basis it is necessary to show also the Accrued Disbursements which consist of Accrued Expense as covered by Accrued Accounts shown by Chart IV. In practical accounting it is seldom that any debit Accrued Disburse-

ment Accounts are carried on the books. Instead of debiting an Accrued Disbursement Account and crediting an Accrued Account Payable at the end of each accounting period, in order to show an accrued liability, and then closing the Accrued Disbursement Account by a credit and debiting the proper expense account, in order to obtain the accrued expense applicable to each operating period, the credit to each Accrued Account Payable is offset by a debit direct to the proper expense account. This obtains the results desired and saves bookkeeping.

In addition to the Actual and Accrued Disbursements there are the Deferred Disbursements consisting of charges for Depreciation of Equipment and Depletion of Mines. These charges are made upon the operating books by journal entry and are transferred to the Administrative Books through the Treasurer's Account and are the amounts which represent the capital returned by production and are not included in Operating Expense, but are charged direct to the Income Account and shown as a deduction from Gross Income.

The Deferred Disbursements should not be confused with Deferred Expense charges which are herein considered as Prepaid Expense.

ACTUAL DISBURSEMENT—DIRECT

Actual Disbursements consist of Direct and Indirect Disbursements. The Direct Disbursements are Labor, Bills Audited, and Supplies Issued; while the Indirect Disbursements consist of Labor, Supplies and Expense charges to Shops and Power Plants.

LABOR

The Labor Disbursement Account showing the total amount of all pay-rolls for labor employed and for which operations must account is created and supported, as follows:

Employment of Labor.—Proper authorization of all labor employed must be made before the name of an employee is entered upon the pay-rolls. The applicant, after making application for employment, is given by the employing agent, an Engagement Slip, which the applicant signs in the presence of the employing agent and which he then presents to the physician, by whom he is examined to determine whether or not he is physically qualified for the work for which he has been engaged.

The physician makes a thorough examination of the applicant and records his findings. If the applicant proves to be unfit, the physician takes up the engagement slip, marks on it "rejected," and returns it to the employment office. If recommended, the applicant again signs the engagement slip on the observe side, in the presence of the physician, and presents the approved card to the timekeeper, who requires him to fill out and sign an Employment Card, and who gives the applicant an

Identification Card to be by him presented to the shifter or the person who is to be responsible for his work and who is to report the distribution of his time. The employee signs the Identification Card in the presence of the person who is to report his time and the man is placed at work.

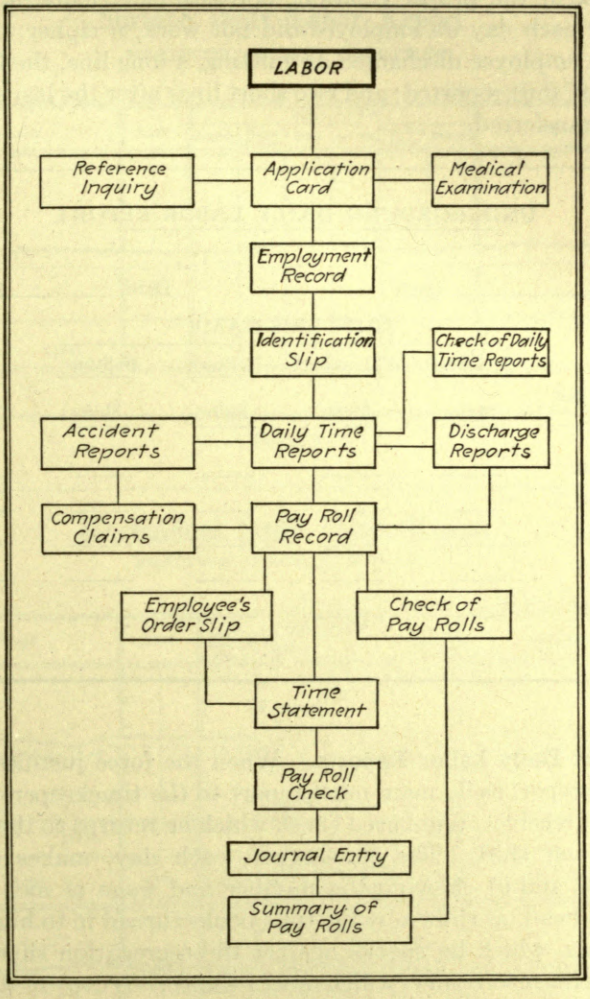


CHART V.

The card is then returned to the Employment agent by the shifter or foreman and the employee's name is entered in the Daily Time Book.

Where a report is obtained on all men employed, an inquiry is sent out to last employer and a note made upon the application card of the answer received.

Labor Reports.—Each person having direct supervision of labor reports the time of each employee, each day, on going off shift by turning

in to the timekeeper his Daily Time Book in which a record of the time of each man is kept as follows:

Opposite each name shown on the time book, in the space under each date column, for each full day worked, a vertical line; for each part of a day worked, the proper fraction; opposite each name in the proper column for each day an employee did not work, a cipher; opposite the name of an employee discharged or quitting, a long line, the line to begin after the last shift reported; and two short lines after the last shift worked of a man transferred.

UNDERGROUND DAILY LABOR REPORT

For_____ Shaft Date_____ 192__

	SHIFTER'S NAME				
	J. Geldart	W. Lambert	E. Powe	F. Stone	
Rate per Day	Shifts	Shifts	Shifts	Shifts	Total
5.60					
6.10					
6.35					
6.60					
Totals					

FORM 7.

Check of Daily Labor Reports.—When the force justifies a day and night timekeeper, each man must report to the timekeeper when going on shift and receive a numbered check which he returns to the timekeeper on coming off shift. The timekeeper, each day, makes a summary (Forms 7, 8, and 9) showing the number and wage of men under each supervising head, as shown by the time books turned in to him by the different bosses, which he checks against the segregation slips turned in, and against his record, all of which must balance. A copy of the summary for each department is delivered to each department head, and copies of the complete summary are delivered to the Manager and to the Accounting Office. At the end of each pay period, new daily time books are written up for all bosses by the timekeeper, the names in the books being grouped as to rates and arranged alphabetically.

Record of Labor Reports.—A record of all the time reports is made on the Pay-rolls, a roll being kept for each department, also for each shop, and for each surface division. The total shifts of all rolls must balance

with the total shifts of the time books, as well as with the total shifts of all segregations, when checked each day and at the end of each accounting period.

Surface Daily Labor Report

SHATTUCK ARIZONA COPPER CO.

192

CLASS	RATE	TOTAL SHIFTS						REMARKS
		General	Waste Haulage	Tram	Sawmill	Carpenter Shop	TOTAL	
TOTAL								

FORM 8.

Mechanical Daily Labor Report

SHATTUCK ARIZONA COPPER CO.

192

CLASS	RATE	TOTAL SHIFTS				TOTAL	REMARKS
		Machine Shop	Black-smith Shop				
TOTAL							
CLASS	RATE	TOTAL SHIFTS				TOTAL	REMARKS
		Hoists	Comp. & Boilers	Mine Pumps	Water & Oil pumps		
TOTAL							

FORM 9.

Upon an employee leaving or being discharged from the company's service before the end of a pay period, he is given, by the person who is responsible for his labor, a Discharge Report which report is in two parts.

The part requesting payment is given to the employee leaving the company's service and by him given to the timekeeper, who delivers the employee a time statement (Form 10) to be signed and delivered to the Paymaster at the same time he receives his pay check; and the part showing the employee's record is forwarded to the employment agent for his use in completing the employee's record on the application Card, which

FORM 9

Check No._____ Roll No._____

NOT TRANSFERABLE

IN ACCOUNT WITH

Shattuck Arizona Copper Company

For Half Month Ending_____, 191__

CREDITS

By_____	Days	at $4.25		
By_____	Days	at $4.00		
By_____	Days	at $3.75		
By_____	Days	at $3.50		
By_____	Days	at $_____		

DEBITS

Hospital				
Store				
Insurance				
Subscription				
Cash				
Balance as per pay roll				

Received payment in full _____

NOTE.—This should be signed before presenting.

12-21-16 50M CRANE 14768

FORM 10.—Time Statement.

card is then transferred from the "live" to the "dead" file. This is also done by the Paymaster to prevent the further carrying on the rolls of the discharged employee, and to keep the record a live file which will give accurate information of the employee. Each day or on certain days a list of the names of "quitters" is furnished the dispensary for its protection in extending medical services.

Accidents.—A Report of each accident to each employee is made by the person in charge, and when an employee is off duty 14 days or more

and has accepted compensation as provided by law he is placed on the compensation roll. After the close of each month, a report is made to the State Mine Inspector of all men injured who lost time, or as required by the State Laws.

Orders and Deductions.—Deductions are made upon the pay-rolls to meet employees' orders for insurance premiums, subscriptions, store and individual accounts; also for hospital fees, and for cash advances. Hospital fees, for hospital and medical service, are deducted from all employees' wages who have been in the service of the company, the amount being determined according to whether the employee is married or single, and is always uniform. The Hospital deduction is entered against each employee on the roll, in the column provided therefor, at the end of each pay-roll period.

Cash deductions are for cash advances as shown by signed statements taken by the Paymaster when making advances to employees, and are entered on the pay-roll at the time each advance is made.

All other deductions, such as for insurance premiums, subscriptions, store and other accounts are covered by orders which must be worded to comply with the law of the State covering such matters, and are entered on the rolls at the time the orders are received.

Balancing Pay-rolls.—As the Accounting Period invariably ends with each calendar month, it is necessary, at such time, that the timekeeper, before sending the rolls to the Paymaster, balance them against the time books as to total shifts. After they are received by the Paymaster, the Cash Advance Deductions are balanced against the General Cash Book record, and Time Statements are then made out for the balance due each employee showing thereon all deductions, extensions being made and checked on the pay-rolls at the same time. A recapitulation of the rolls is then made (Form No. 11) and checked against the cost segregations as to shifts and dollars (Form No. 12). The time statements are then numbered with the pay-roll numbers, the paid time statements taken out and checks drawn to satisfy the unpaid statements.

Time Statements and Payments.—Payment to each employee is made on the regular pay days for the net amount due, after any and all deductions have been made as shown on the roll and by the Time Statement, which latter is made out at the time the roll is extended and balanced, and which is then distributed to the men by each supervisor of labor, the day before pay day, for their examination and information. The time statement is signed by each employee and is presented by him to the Paymaster on Pay Day, at which time his Pay Cheque is delivered to him.

Labor Disbursement Account.—In order to make a record upon the books of the company to show the amount of the month's labor for which the operations must furnish distribution, as well as to show the liability

TIME AND PAY ROLL FOR HALF MONTH ENDING *February 28*, 1919

NAME	Occupation	CREDITS Days	Rate	Tot. Amount	DEDUCTIONS Hospital	Store	Insurance	Bonds	Sundries	Cash	Balance Due	Statement No.
General Roll	*Sheet 1*			2 258 64	20 25			510 00		313 32	1 415 07	
Shifters ,,	*2*			1 083 89	9 25		2 60	140 00			932 04	
Mill ,,	*3*			138 45	1 50						136 95	
Surface ,,	*4*			884 31	14 50	18 65		190 00	16 00	16 35	628 81	
,, ,,	*5*			305 53	6 25	23 40		40 00	9 00	37 20	189 68	
,, ,,	*6*			323 10	7 00	42 40		115 00	9 00	14 25	135 45	
Mechanical Roll	*7*			973 34	13 25		3 75	160 00	5 00		791 34	
,, ,,	*8*			609 49	9 25			170 00	50		511 074	
Underground	*9*		756 80		15 00	10 20	7 60	170 00		45 98	508 02	
,, ,,	*10*		616 35		12 00	11 75	3 80	120 00	15 00	84 66	569 14	
,, ,,	*11*		761 06		14 75	3 50	3 80	160 00	5 65	75 93	497 43	
,, ,,	*12*		591 71		14 50	4 50	7 60	130 00		38 95	396 16	
,, ,,	*13*		756 16		15 75	45 85		235 00	65	74 65	384 26	
,, ,,	*14*		502 79		10 00		3 80	122 50	65	28 68	332 76	
,, ,,	*15*		648 70		18 00	18 90		260 00		40 75	511 05	
,, ,,	*16*		543 25		13 25	4 70	3 80	100 00		101 50	320 00	
,, ,,	*17*		742 95		17 25	9 00	7 60	235 00	7 60	32 20	454 30	
,, ,,	*18*		494 50		16 00			180 00		39 50	259 00	
,, ,,	*19*		494 40	6 908 67	14 75	14 75	3 75	130 00		73 85	2 567 30	
Service Bonus	*20*			300 00						100 00	200 00	
Accident Compensation	*21*			96 49						61 43	35 06	
Drift Bonus	*22*			137 84							137 84	
				14 100 75	242 50	207 60	48 10	3167 50	69 05	1179 20	9 045 96	
	Hospital Deductions										242 50	
	Stare ,,										163 50	
	Insurance ,,		Less 5%								4 56 9	
	Liberty Bond ,,										316 750	
	Employees Orders Deducted										41 90	
	favor of Chris Vukasovich		Less 5%								15 00	
	F. Rennock										9 00	
	Henessey Und. Co.											
	Juan Araiza									2550		
	Int. Corr. School										10 00	
	Materials Sold										9 55	
	Discounts on Orders										4 61	
									Cash		1 204 70	
				14 100 75							14 100 75	

FORM 11.—Recapitulation of Pay Rolls.

UNDERGROUND LABOR

DECEMBER, 1916

Date	Muckers 5.60	Miners 5.85	Tmb. and Cgr. 6.10	Shaftmen		Demonstr. 6.85	Total
				6.35	6.60		
12– 1	203.25	148	28	2			381.25
2	205.25	148	28	2	0		383.25
3				2	0		2
4	204.25	150	27	2	0		383.25
5	211.50	146	28	2	0		387.50
6	204.25	142.50	29	2	0		377.75
7	205.50	151	27	2	0		385.50
8	210	150.25	28	2	0		390.25
9	212	147	28	2	0		389.
10				2	0		2
11	210	153.25	30	1	1		3 95.25
12	212.25	156	31	1	1		401.25
13	213.25	154.75	31	1	1		401
14	212.50	157	31	1	1		402.50
15	213.50	157	31	1	1		403.50
	2,717.50	1,960.75	377	25	4		5,085.25
	$15,218.00	$11,470.39	$2,299.70	$158.75	$33.00		$29,179.84
						Difference.....	.02
						Roll.....	$29,179.86
16	210.25	156.25	31	1	1		399.50
17	107	73	15	1	1		197
18	209	153	28	1	1	1	393
19	217	156	29	1	1	1	405
20	214.25	152	28	1	1	1	397.25
21	177.50	149.75	32.5	1.5	1.5	1	363.75
22	153	113	26	1	1	1	295
23	196.5	144	28	1	1	0	370.50
24	100.25	74	14	1	1	0	190.25
25				2	2		4
26	210	150	27	1	1	1	390
27	209.50	152.50	29	1	1	1	394
28	209.375	149	27	1	1	1	388.375
29	209	148.50	29	1	1	1	389.50
30	209.25	151	29	1	1	1	392.25
31				1	1		2
	2,631.875	1,922	372.50	17.5	17.5	10	4,971.375
	$14,738.50	$11,243.70	$2,272.25	$111.13	$115.50	$68.50	$28,549.58
						Difference.....	.02
						Roll.....	$28,549.60
For Month:							
	5,349.375	3,882.75	749.50	42.5	22.5	10	10,056.625
	$29,956.50	$22,714.09	$4,571.95	$269.88	$148.50	$68.50	$57,729.42

FORM 12.

therefor which must be satisfied by cash disbursements, an entry is made in the Journal for posting to the general and subsidiary ledgers of the total amount of all rolls, as follows:

Labor	$67,383.45	
To Accounts Payable		$67,383.45
Labor	$67,383.45	

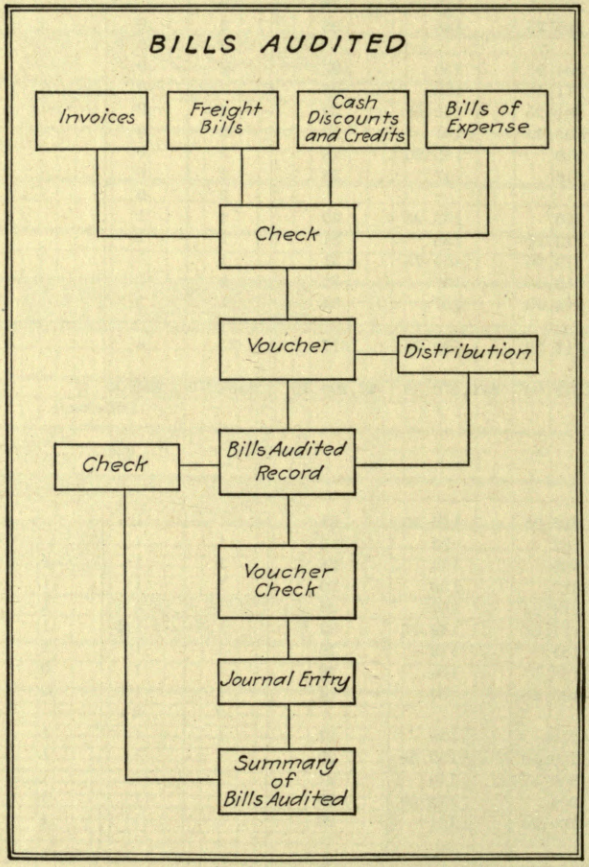


CHART VI.

BILLS AUDITED

The Bills Audited Disbursement Account is charged with the total amount of all vouchers audited for properly authorized and checked invoices, freight bills, statements of expense incurred, statements of amounts due on authorized contracts, for which vouchers have been recorded in the Bills Audited record, Form 13.

Invoices and Freight Bills.—All invoices for materials and supplies purchased and received each month, and all freight bills for materials received that have been approved by the Purchasing Department, are

covered by vouchers in favor of the proper persons, firms or corporations. The form of invoice is determined by the nature of the business of the company which furnished the materials and a copy of each invoice is attached to the voucher or filed with the voucher number marked thereon.

Cash Discounts and Credits.—In recording the vouchers in the Bills Audited Record, the amount of each cash discount and the amount of each credit taken that does not apply to the invoice vouchered, but which is to offset a previous charge to Accounts Receivable, etc., is entered in the Credit column; and at the end of the accounting period, when the Bills Audited Record is closed, a voucher is made in favor of the company for the total of the Discounts and Credits which balances the net amount of the Bills Audited Record with the distribution segregations.

Bills of Expense.—Bills of Expense are rendered to the Accounting Department and are for expense incurred by the employees of the company, or for amounts due to others on authorized contracts, and, upon approval by the proper department head, are vouchered.

Check of Invoices, Etc.—Before payment can be made, all invoices, freight bills, or bills of expense, must bear proper evidence of check and approval. The usual method is to stamp upon the face of the invoice, etc., by a rubber stamp, a form to be filled in and signed by the proper person.

Vouchers.—Vouchers are made out in original only, and when in payment of invoices the original copy of each invoice is attached to the voucher; when in payment of freight bills, the date, number, weights, items and amount of each are listed on the face of the voucher; when for Discounts the month is specified in which discounts were taken; when for Credits the nature and account of each credit is stated; and when for bills of expense the original copy of each bill is attached. When a voucher cheque is used the date and number of the invoice or bill of expense, etc., is listed on the voucher and the invoice is filed after being marked with number of voucher cheque.

The distribution to the proper warehouse stocks of the materials received and freights paid, as well as the distribution to the proper expense accounts of the bills of expense, are shown on the back of each voucher. The proper distribution of the Discounts and Credits is shown on the face of the voucher. Vouchers for invoices subject to discount are made out and delivered immediately. Vouchers for all other approved invoices or bills of expense are made out and usually delivered before the tenth of the following month.

Bills Audited Record.—The approved vouchers are entered in the Bills Audited Record (Form 13) numerically and according to the month in which the expense was paid. When vouchers have been made of all approved invoices and freight bills and of all expense with which the month's operations is to be charged, the Bills Audited Record is closed,

SHATTUCK ARIZONA COPPER COMPANY

VOUCHER NO.	DATE PAID	FAVOR OF	CREDITS		NET AMOUNT	MATERIAL AND SUPPLIES								
			ACCOUNT	AMOUNT		GENERAL	IRON AND STEEL	EXPLOSIVES	FUEL	LUMBER AND TIMBER	MACHINERY	PIPE AND FITTINGS	OILS AND GREASES	TOOLS

RECORD OF BILLS AUDITED, MONTH OF _____ 19___

	HANDLING		SHOPS AND POWER		OPERATING EXPENSE						ACCOUNTS RECEIVABLE		SUNDRIES		REMARKS
					MINING		OPERATING OVERHEAD		ALL OTHER						
	ACCOUNT	AMOUNT	ACCOUNT	AMOUNT	ACCOUNT	AMOUNT	ACCOUNT	AMOUNT	ACCOUNT	AMOUNT	ACCOUNT	AMOUNT	ACCOUNT	AMOUNT	

a voucher made in favor of the company for the total amount of the month's Credits and Discounts, and the record balanced.

Check of Bills Audited Record.—A summary of the distributions in the Bills Audited Record is made and this summary total must balance with the total of the amounts listed in the Net Amount Payable, plus the Credit Columns; also with the total of the Bills Audited Cheques issued as listed in the Bills Audited Cheque Register.

Voucher Cheque.—Voucher cheques are drawn to satisfy the amount of the approved vouchers and the cheques listed in the Bills Audited Cheque Register. The cheques, together with the Vouchers, are delivered or mailed to the proper persons, firms or corporations, in whose favor they are drawn, and who are to receipt therefor.

Bills Audited Disbursement Account.—In order to record upon the books the amount of the Bills Audited Disbursements, of which distributions must be made, and to show the liability therefor, a Journal Entry is made for the total amount of the summary of the Bills Audited Record, as follows:

Bills Audited	$94,245.62	
To Accounts Payable		$94,245.62
Bills Audited	$94,245.62	

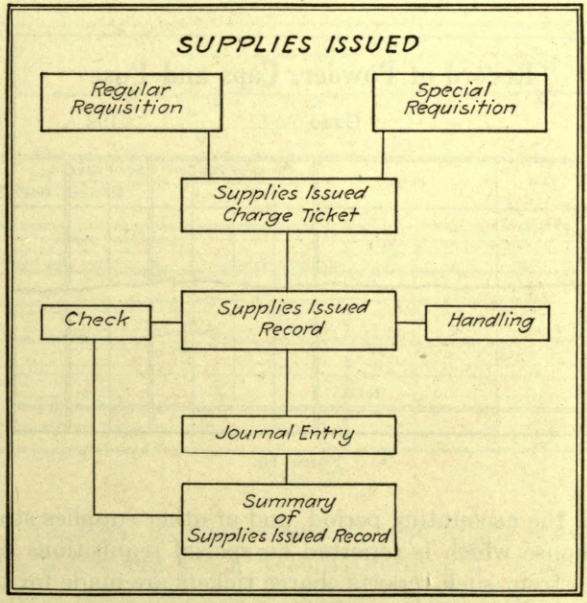


CHART VII.

SUPPLIES ISSUED

The Supplies Issued Disbursement Account is charged with the total of all materials and supplies issued to operations as shown by the Supplies Issued Record, and is created, as follows:

Authorization of Disbursements of Supplies.—Disbursements of materials and supplies are made upon requisitions (Form 14) signed by persons having authority to requisition supplies, except for such supplies as fuel oil, where the tanks are measured at the end of each accounting period, and of timber sawed and framed by the sawmill, where a check of the materials delivered to and from the sawmill is taken each day and

REQUISTION FOR SUPPLIES

SHATTUCK ARIZONA COPPER CO.

STOREKEEPER: ----------191----

Issued to_____

Warehouses Account No.	QUANTITY	ARTICLE	FOR

Title

FORM 14.

Record of Powder, Caps and Fuse

Used_____192____

Level	PLACE	STICKS OF POWER				NO. OF CAPS		Feet Fuse
	TOTAL							

FORM 15.

at the end of the accounting period, and of other supplies stored outside of the warehouse which is reported on special requisitions as shown by Form 15 and from such reports charge tickets are made for the month's consumption of oil, timber, powder, etc., used.

Report of Supplies Issued.—Each day, the Storekeeper compiles the requisitions for supplies and makes out Supplies Issued Tickets (Form 16), one ticket for each operating department unit, or sub-unit, repair or construction job, to which supplies have been issued as shown by the

requisitions, entering on each ticket, above the name of the article, the quantity issued, and at the end of the fifth day, the total of the issues of each article is extended to the "quantity" column and the number of the stock to be credited is noted in the "stock" column. The warehouse stock cards are then consulted for prices of each of the articles and the total amount is extended on the charge ticket to the "amount" column.

Supplies Issued Ticket

Shattuck Arizona Copper Co

_____, 192

Charge to _____

Account No. _____

Stock No.	QUANTITY	ARTICLES	AMOUNT	
		TOTAL		

Storekeeper

FORM 16.

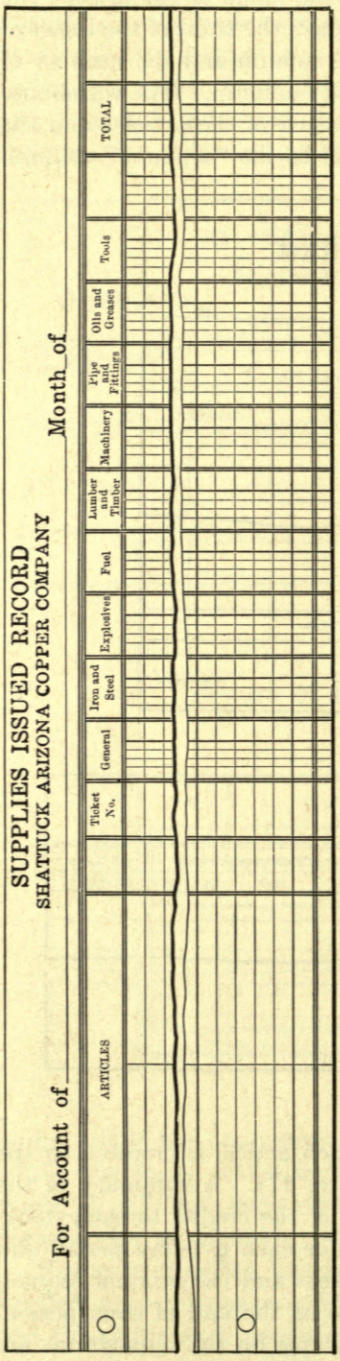
STOCK RECORD OF

STOCK RECEIVED					GIVEN OUT ON REQUISITIONS			ON HAND
DATE REC'D	ORDER NO	FROM WHOM	QUANTITY	UNIT COST	DATE	ACCT.	QUANTITY	QUANTITY

FORM 17.

At the same time the quantity issued of each article is credited to the stock on the Warehouse Stock Record (Form 17). A summary of the charge tickets is made and also a summary of the credits to each stock, which must balance with the total charges for each five-day period and this summary together with the charge tickets and the original requisitions are forwarded to the accounting office at the end of each period.

Record of Supplies Issued.—First, the items on the requisitions are checked against the items charged on the charge tickets to ascertain


SUPPLIES ISSUED RECORD
SHATTUCK ARIZONA COPPER COMPANY
For Account of _____ Month of _____
ARTICLES
Ticket No.
General
Iron and Steel
Explosives
Fuel
Lumber and Timber
Machinery
Pipe and Fittings
Oils and Greases
Tools
TOTAL

FORM 18.

whether or not all items issued have been charged, and then the charge tickets are numbered and entered on the Supplies Issued Sheets (Form 18), one sheet being used for each department unit or sub-unit, repair or construction job. The names of all articles charged to Asset Accounts are written in on the sheets, but only the ticket numbers and the amounts credited to each stock are entered on the sheets for charges to Operating Department accounts or sub-accounts.

In the case of powder, caps and fuse issued to the mine, the men responsible for the distribution of such supplies note their distributions in a record (Form 15) from which charge tickets are made at the end of each accounting period after adjustment has been made with the warehouse and by inventory of such supplies unused on hand in the mine.

Handling.—At the end of each month, or accounting period, the total of the general handling charges for the previous month, consisting of Warehouse Expense, Yard and Miscellaneous Labor, and Teaming, etc., is pro-rated over the total supplies issued; first, by dividing the total of the supply stocks, except that of fuel oil, into the total of the general handling charges and obtaining the ratio of handling cost to each dollar of supplies issued; second, multiplying the total of the credits to each stock on each Supplies Issued Sheet, except fuel oil, by this factor to obtain the total handling charge for each stock for each account or department unit, or sub-unit.

The fuel oil stock is usually charged at the close of each month with the amount of the total pumping oil cost

only, and the lumber and timber stock is charged with the total framing timber cost as well as the handling cost. The costs of "Handling," "Pumping oil," and "Framing," etc., are always for the previous month.

An illustration of the entry for Handling is as follows:

General	$163.67	
Iron and Steel	31.05	
Explosives	327.49	
Fuel	104.65	
Lumber and Timber	696.85	
Machinery	62.62	
Pipe and Fittings	46.14	
Oils and Greases	10.73	
Tools	15.66	
To Handling		$1,458.86
Framing	$448.06	
Pumping Oil	104.65	
Warehouse Expense	624.77	
Miscellaneous Labor	261.55	
Teaming	11.50	
Switching	8.33	

"Closing out the 'Handling' account for previous month."

While this entry should be made on a Summary Cost Sheet for posting to Cost Ledger, it is very often made in the General Journal and posted to the Cost Ledger using the subsidiary column of the General Journal.

In charging to Materials and Supply Stocks the amount of the Handling for each operating month, and, at the end of the following month crediting Materials and Supplies a like amount and pro-rating same over the amounts of the supplies issued to the different operating departments or sub-departments, it is possible to close the Materials and Supplies Account at the end of the accounting period immediately without delay to the bookkeeping and costing routine. The other method of disposing of the handling expense is by the laborious process of pro-rating a certain percentage of the handling to each article when costing all supplies as received at the warehouse.

Check of Supplies Issued.—The original supply requisitions, after they have been checked against the Supplies Issued Tickets and the accuracy of the charges determined, are sorted and delivered to the heads of the operating departments at the end of each week, or at set intervals to insure that the supplies issued from the warehouse were properly authorized. The summary according to stocks of the charge tickets is checked against the total of the Supplies Issued Sheets at the end of each month, and when balanced the tickets are punched and filed for reference.

Supplies Issued Disbursement Account.—At the end of the accounting period, in order to make a record upon the books to show the amount

of the Supplies Issued for which the Operations must furnish distribution, a Journal Entry is made, as follows:

SUPPLIES ISSUED		$29,359.41	
To MATERIALS AND SUPPLIES			$29,359.41
General	$5,495.52		
Iron and Steel	701.46		
Explosives	7,914.72		
Fuel	3,636.59		
Lumber and Timber	8,044.19		
Machinery	1,904.95		
Pipe and Fittings	826.39		
Oils and Greases	316.36		
Tools	519.23		

Postings of these amounts are made to the General and Subsidiary Ledger Accounts, and give the amount of supplies charged to operations and the credit charges to Materials and Supplies accounts:

SUMMARY OF DIRECT DISBURSEMENTS

A statement taken from the operating ledger at this stage would show the actual operating disbursements and liability therefor as follows

Labor	$67,383.45	
Bills audited	94,245.62	
Supplies issued	29,359.41	
To Accounts Payable		$161,629.07
Materials and Supplies		29,359.41

We now have the amount of disbursements chargeable to operations as shown by the Labor, Bills Audited and Supplies Issued Accounts, and the amount of liabilities to others shown by the Accounts Payable Account that must be satisfied by cash payments as well as the amount of credit to stocks for materials issued to operations. However, in order that proper costing may be obtained it is necessary to divide the actual disbursements into Direct and Indirect Disbursements by showing the amount of disbursements that are applied to operations indirectly and create the necessary indirect disbursement accounts to take care of such disbursements.

OPERATING DISBURSEMENTS

ACTUAL DISBURSEMENTS—INDIRECT

Indirect Disbursements are subsidiary divisions of the Direct Disbursements of Labor, Supplies and Expense that are applied to operations indirectly by means of the Shops and Power Plants.

Shops.—The Shops operated by producing mining companies generally consist of Machine Shop, Blacksmith Shop, and Carpenter Shop,

and Sawmill, for which a control account is carried in the general ledger entitled "Shops," and a detail account for each is kept in the cost ledger. These Shops are considered auxiliary departments, as the work done therein is not for production itself, but secondarily for new construction, for renewals to operating equipment and primarily for repairing and replacing operating equipment. Therefore, all labor employed in the Shops is recorded on separate rolls, all supplies used are entered on separate Supplies Issued sheets, and all expense paid is listed under shops in the Bills Audited Record. A credit charge is made each to Labor, Supplies Issued and Bills Audited, for the amount of Labor, Supplies and Expense chargeable to shops, and charges made to Control and Subsidiary Accounts, as follows:

Shops	$9,365.97	
To Labor		$9,032.88
Supplies Issued		274.62
Bills Audited		58.47

In actual practice, a Journal Entry is made to cover the charges to the Shops each for Labor, Supplies Issued and Bills Audited instead of one entry as shown above. The replacement and repair charges, if any, to the Shops are made when the Replacement and Repair Accounts are cleared each month. All supplies used by the Shops which are not for their direct operations but for Construction, Replacements, Repairs, Jobs, or Operating Departments are charged on Supplies Issued Sheets, one sheet for each account, department or job.

Power.—The Power units generally operated by producing mines consist of boilers, air compressors, air drills and electrical plant, for all of which a control account is kept in the general ledger entitled "Power" and the detail accounts of each are carried in the cost ledger.

These power units either produce power for or apply power to the mining operations and are auxiliary divisions of mining operations, as mining can be done without the use of any of these power units.

Charges for Labor, Supplies and Expense to Power Accounts, or the subsidiary power accounts, are to offset credits to the direct disbursement accounts of Labor, Supplies Issued, and Bills Audited, as follows:

Power	$5,716.44	
To Labor		$1,343.74
Supplies Issued		3,793.24
Bills Audited		579.46

The Replacement and Repair charges, if any, are made when the Replacement Accounts are cleared each month.

SUMMARY OF ACTUAL DISBURSEMENTS

We now would have a record of the Actual Disbursement divided into Direct and Indirect, as follows:

Labor	$57,006.83
Supplies	25,291.55
Bills Audited	93,607.69
Shops	8,647.85
Power	6,434.56

offset by disbursement liabilities of

Accounts Payable	$161,629.07
Materials and Supplies	29,359.41

This takes care of the disbursements to operations except accrued disbursements which must be recorded in each period of operation, although the actual disbursements therefor come up at sometime in the future, and of deferred disbursements to take care of depletion and depreciation.

ACCRUED AND DEFERRED DISBURSEMENTS

Accrued Disbursements

In accounting Accrued Disbursements refer to those liabilities which are recorded upon the books at the end of each operating period, the payments of which are made in a future period. These consist of accrued operating expense such as refining and selling expense charged against each month's production, but for which payments are made several months later for the refining, and for the selling after the metal has been sold; of Taxes Accruing for which a charge is made to operating expense each month for the monthly proportion of the year's taxes; and of Accident Liabilities when the business sets aside each month a certain per cent of its pay-rolls as a reserve with which to meet the payments that will have to be made to satisfy the requirements of the law in case of serious accidents and in settlement of accident claims. Where a policy is taken out to cover such liability and the premium is paid in advance, then a direct disbursement is made and the accrued charges to operating expense are carried under Prepaid Expense.

In practice it is only when the accounting and costing records are separate that it is necessary to carry the accrued disbursement accounts on the books. For instance, instead of debiting Taxes Accruing and crediting Reserve for Taxes for the month's proportion of taxes, and then crediting Taxes Accruing and debiting Operating Overhead-taxes a like amount, in order to get on the books both the liability and the proper charge to operating expense, the credit to Reserve for Taxes is

offset by a debit direct to Operating Overhead-taxes which saves the opening and closing of the account Taxes Accruing and still records the liability on the books as well as making the proper charge to operations. However, where it is desired to keep the cost segregations complete and separate, it is best to carry the accrued disbursement debit accounts in the general ledger.

This is also true of the Accident Liability, Bullion Freight and Refining Expense Accruing, and Selling Expense Accruing Accounts. They are seldom carried on the books in practice and are shown on the Chart to demonstrate the principles involved. However, in order to make the accounting illustrations correct in theory we will show the charges to the Accrued Accounts. Journal entries for Accrued Disbursements are made for each period's accrued disbursements, as follows:

Accident Liability	$ 2,695.35	
To Reserve for Accidents		$ 2,695.35
"Four per cent of pay-roll reserved for protection against payments on account of accidents."		
Taxes Accruing	$ 9,721.05	
To Reserve for Taxes		$ 9,721.05
"One-twelfth of the amount estimated for State and County Taxes."		
Bullion, Freight and Refining Accruing	$14,320.45	
To Bullion Freight and Refining Not Due		$14,320.45
"Cost of Freight and Refining of 849,840 lb. copper at 0.016 ct. and extra charge of $2.48 per ton on 588,230 lb."		
Selling Expense Accruing	$ 3,992.35	
To Selling Expense Not Due		$ 3,992.35
"Estimated cost of selling and delivery of copper at 0.0047 ct."		

Where an estimated figure is used as the basis of an entry, as in the case of Selling, the estimated figure is revised from time to time to keep the estimate as near the actual as possible.

Deferred Disbursements

Deferred Disbursements consist of book charges for:

Depreciation of Equipment, and

Depletion of Mines,

and are proportional charges of past disbursements made for Equipment, Mine Property and Mine Development.

While these charges are taken up on the operating books in order that it may be known whether or not operations are resulting in a profit or a loss for each period, the deferred charges are not distributed over the departments of expense but are carried to the Administrative books and closed direct into the Income or Profit and Loss Account at the end of each year.

DEPRECIATION OF EQUIPMENT

The monthly charge for Depreciation of Equipment is determined either according to the estimated length of life of each unit of equipment, which requires a schedule to be made up showing each unit of equipment, its total cost, the estimated length of life and the proportional depreciation charge for each unit of equipment for each month of life; or is based upon the estimated length of life of the mine when the latter is equal to or less than the estimated length of life of the bulk of the equipment; or is based upon an arbitrary length of time such as from 5 to 20 years, depending upon the character of the equipment, the nature of the business, and whether or not the equipment would be liable to become obsolete or too expensive to operate after a certain period of use.

It is considered good policy in mining, after the mine enters the production stage, to base the life of all equipment on a period of 10 years of operation. Of course, some of the equipment will not have a life of 10 years, and such equipment will have to be replaced through replacement charges to operation. If the replacement charges are made against the depreciation reserve then, of course, the depreciation charges will need to be raised.

When an average life of all equipment is taken, the necessary replacement charges to prolong the life of that part of the equipment of less life than the estimated life are charged to production operation.

The depreciation charge is taken up on the operating books by journal entry, as follows:

Depreciation of Equipment	$3,568.33	
To Reserve for Depreciation		$3,568.33

"Being 1⅓ per cent of the total Construction and Equipment Account, or at rate of 15 per cent per year."

Whatever adjustment that may be needed to make the depreciation charge exact is made the last month of the year.

DEPLETION OF MINES

The Depletion of Mines monthly charge is determined by multiplying the depletion factor by the number of wet tons of ore smelted or by the number of pounds of metal recovered or produced from ore smelted.

The depletion factor for each year is obtained by dividing the total property investment, less the amount of depletion previously set aside, by the number of wet tons of commercial ore in sight, plus the number of tons of probable ore that will be developed according to the estimates, judgment or expectations of the company's engineers. However in making return of income for purpose of federal taxes, the depletion charge is obtained by multiplying the depletion factor allowed by the Treasury Department by the number of units of metal sold.

According to federal tax law the property investment for mines whose properties were purchased prior to Marh 1, 1913, is the fair market value of the ore in place in the mine on that date, and the property investment of mines whose properties were acquired since March 1, 1913, is the actual investment in the mine property, or purchase price plus development not charged to operation, or the discovery value thirty days after date of discovery.

The law does not specify as to how "the fair market value of the ore in place as of March 1, 1913," shall be determined, neither does it specify what shall constitute the "actual investment in mine property or the discovery value." Such determinations are left up to the regulations of the Treasury Department, the main points of which are set forth in Chapter V.

Therefore, the determining of the depletion factor, as far as the amount that will be allowed by the Federal Government, is a matter that must be settled with the Treasury Department. However, each individual mine may determine its depreciation and its depletion charges to operations according to its own judgment as to what should be charged to each year's production in order to properly distribute the capital investment in equipment and mine property against each year's production earnings during the life of production, and can make a revised report for taxation purposes. The recent ruling of the Treasury Department in regard to depletion is that the depletion charge must be taken as the produced ore, metal or mineral is sold and not as it is produced as has been the accepted custom heretofore.

In proportion to the accuracy exercised by each company in distributing its capital investment charges of depreciation and depletion to production is the true production cost and the actual earnings known.

Therefore, when the fair market value of the mine property as of March 1, 1913, or the discovery value, is greater than the actual investment, in order that the actual production cost may be known, it is well to divide the depletion charge, making one charge for actual depletion based on investment, and an additional charge to take care of the increased value as of March 1, 1913.

The depletion charge based on cost may be taken up on the operating books at the end of each accounting period, so as to give the actual cost, while the additional charge can be taken up at the end of the year on the Administrative Books.

The depletion charge is taken up on the records by journal entry, as follows:

Depletion	$47,514.43	
To Reserve for Depletion		$47,514.43

"Wet tons of ore mined and treated at $4.8963 per ton, based on property value as of March 1, 1913."

It is absolutely necessary that the amounts of depreciation and depletion be taken upon the books each month in order that the operating profit available for regular dividends may be known.

SUMMARY OF DISBURSEMENTS

We have now recorded all the operating disbursements involved in the operation of a producing mine, and a statement taken from the ledger for the period would show the disbursement debit and credit accounts, as follows:

DEBITS

Actual

Labor	$ 57,006.83
Bills Audited	93,607.69
Supplies	25,291.55
Shops	8,647.85
Power	6,434.56

Accrued

Accident Liability	2,695.35
Taxes Accruing	9,721.05
Bullion, Freight and Refining Accruing	14,320.35
Selling Expense Accruing	3,992.35

Deferred

Depreciation of Equipment	3,568.33
Depletion of Mines	47,514.43
	$272,800.44

CREDITS

Actual

Accounts Payable	$161,629.07
Materials and Supplies Issued	29,359.41

Accrued

Reserve for Accidents	2,695.35
Reserve for Taxes	9,721.05
Bullion Freight and Refining Not Due	14,320.45
Selling Expense Not Due	3,992.35

Deferred

Reserve for Depreciation	3,568.33
Reserve for Depletion	47,514.43
	$272,800.44

The liability accounts of Current Accounts Payable, Reserve for Accidents, Reserve for Taxes, Bullion Freight and Refining and Selling Not Due, must stand upon the books until cash payments are made to close them. The Materials and Supplies Credit is made direct to the Materials and Supplies Account, which is reduced a like amount.

The Depreciation and Depletion Reserves are carried on the records until closed out by charges to cover replacements of equipment and for new investments in mining property or are distributed as capital dividends

The deferred charge accounts are transferred to the Administrative Books where they are closed into the Income Account at the end of the year. This leaves the actual and accrued charges against operations which must be distributed either to current expense, prepaid expense or to assets accounts.

CHAPTER VIII

DISTRIBUTION OF DISBURSEMENT CHARGES

When there has been recorded upon the books the Actual Disbursements of Labor, Bills Audited and Supplies, Shops and Power, and the Accrued Disbursements of Accident Liability, Taxes accruing, and Bullion Freight and Refining Expense Accruing, and Selling Expense Accruing, etc., it is then necessary to segregate and distribute these disbursement charges to the proper operating departments of expense, prepaid expense and assets as shown by Chart 4.

All of the disbursements of any one month are not chargeable to the month's expense of production, but contain charges applicable to Prepaid Expense and to Assets, as well as to Reserve Accounts. Therefore, it is necessary to determine what portion is chargeable to each period's production and what portion is not in order that the operating profit or loss, and the cost, for each period may be determined, and what charges are to be carried as assets and what as prepaid expense.

This could be obtained simply by keeping segregations for all charges to Reserve Accounts, to Asset Accounts, Prepaid Expense and Development, debiting the proper controlling and subsidiary Assets, Prepaid Expense, Development Accounts, etc., with the amounts deteremined, leaving in the Actual and Deferred Disbursement Accounts only such amounts chargeable to production.

While this would meet the requirements of accounting as far as recording the charges to assets, production, etc., and the determining of the profit for each period, nevertheless, it would not give the information necessary to locate the reason, or cause of fluctuations in production disbursements, nor the information that would enable the determining of the cost for each of the different production departments, nor would it give the necessary controls needed to obtain departmental costing.

Therefore, the detailing, recording and compiling of the disbursement charges to each operating department, department unit, etc., is done by the Cost Department in order to determine Operating Costs. This is Cost Accounting and will be fully illustrated in the chapters on this subject. However, the accounting records and cost records must interlock, therefore, the summaries of the cost segregations showing the charges to Departmental Expense Accounts, Departmental Prepaid Expense Accounts and to Asset Accounts, according to Chart 4, are the

basis of the entries in the operating journal for posting to the operating ledger and the operating subsidiary ledger, and the journal entries for the accounting records are made up from these cost summaries of Direct, Indirect and Accrued Disbursements, and of Prepaid Expense. The operating ledger will have the regular rulings, while the operating journal should be a three column journal.

DISTRIBUTION OF DIRECT DISBURSEMENTS

The cost segregations of the Direct Disbursements of Labor, Supplies Issued, and Bills Audited are summarized into Expense, Prepaid Expense and Asset Accounts as shown on Chart IV and Journalized as shown hereafter on Forms No. 50.

Labor.—A Journal entry is made of the cost segregations of labor (Form No. 50) showing the total charges to the general operating accounts and crediting the labor charge to operations, as follows:

Expense		
Exploration and Development	$ 6,654.53	
Ore Extraction	38,720.00	
Ore Transportation	995.81	
Smelting	178.50	
Operating Overhead	2,183.40	
Prepaid Expense		
Repairs	566.52	
Replacements	10.76	
Assets		
Construction and Equipment	6,167.27	
Materials and Supplies	728.46	
Accounts Receivable	467.08	
Reserves		
Reserve for Accidents	334.50	
To Labor		$57,006.83

This credit to Labor together with the credit for the amount charged to Shops and Power closes out the total pay-roll charges to operations for labor. The detail charges of the general accounts are posted direct from the cost summaries to the cost ledger and are not journalized.

Supplies Issued.—The cost summary of the segregations of supplies issued showing the total supply charges to each general account is used for the journal entry to close out the Supplies Issued charge to operations, as in the case of labor, as follows:

Expense		
Exploration and Development	$4,249.41	
Ore Extraction	8,067.66	
Ore Transportation	8.43	
Operating Overhead	3.93	
Prepaid Expense		
Repairs	1,360.92	
Replacements	813.49	
Assets		
Construction and Equipment	6,607.02	
Materials and Supplies	11.65	
Accounts Receivable	4,166.10	
Reserves		
Reserve for Accidents	2.94	
To Supplies Issued		$25,291.55

This amount together with the amount charged Shops and Power closes out the total Supplies Issued charged to operations by the Storekeeper in charge of the warehouse. The detail charges to sub-departments, etc., are posted direct to the cost ledger the same as done with Labor charges.

Bills Audited.—The summary of the segregations of the Bills Audited Record showing the total expense charged to each general account is used for the journal entries the same as with Labor and Supplies Issued to close out the amount of Bills Audited charged to operations, as follows:

Expense		
Ore Extraction	$ 533.51	
Ore Transportation	1,982.73	
Smelting	30,662.42	
Operating Overhead	1,047.99	
Prepaid Expense		
Unexpired Insurance	1,308.68	
Materials and Supplies	38,426.91	
Assets		
Construction and Equipment	1,323.75	
Accounts Receivable	2,517.92	
Reserves		
Reserve for Accidents	5.00	
Reserve for Freight and Refining Not Due	15,798.78	
To Bills Audited		$93,607.69

This amount plus the amounts charged the Shops and the Power Accounts closes out the amount of Bills Audited charged to operations for the month.

DISTRIBUTION OF INDIRECT DISBURSEMENTS

Having entered in the Indirect Disbursement Accounts of Shops and Power all the charges from the Direct Disbursement Accounts and from

Prepaid Expense chargeable to the month's operations, distributions of these indirect disbursement charges can be made.

Shops.—A journal entry to cover Shop charges to operations is made from the summary of cost segregations, as follows:

Expense		
Ore Extraction	$ 213.51	
Prepaid Expense		
Repairs	2,182.01	
Replacements	300.36	
Assets		
Construction and Equipment	5,290.92	
Materials and Supplies	586.65	
Accounts Receivable	74.40	
To Shops		$8,647.85

The posting of the detail shop charges are handled as in the case of Labor, Supplies, Etc.

Power.—The charges to power are closed out to the proper operating accounts, etc., by journal entry according to the cost segregations of Power, the summary charges to general accounts only being used, as follows:

Expense:		
Development	$2,278.48	
Ore Extraction	6,750.96	
Assets:		
Materials and Supplies	16.86	
To Power		$9,046.30

closing our December Power charges to operation.

DISTRIBUTION OF ACCRUED DISBURSEMENTS

When charges are made to the Accrued Accounts instead of directly to the expense accounts it is necessary to close out the accrued charges to operating accounts by journal entry for posting to general ledger, as follows:

Operating Overhead	$12,416.42	
To Accident Liability		$2,695.35
Taxes Accruing		9,721.07

charging out the amount of Accident Liability and Accrued Taxes for the month.

Bullion Freight and Refining	$14,320.45	
To Bullion Freight and Refining Accrued		$14,320.45

closing out the accrued freight and refining charges on the month's production.

Selling Expense	$3,992.35	
To Selling Expense Accrued		$3,992.35

charging out the estimated accrued selling expense.

On account of the small number of journal entries necessary to take care of the Accrued Charges complete entries may be made in the general journal for postings both to the general and the cost ledger, in which case the entries for posting to the cost ledger are made in the subsidiary journal column.

DISTRIBUTION OF PREPAID EXPENSE

While the closing out of the Indirect Disbursements of Shops and power disbursements would naturally follow in regular order after the Direct Disbursements. However, on account of the Prepaid Expense that it is required to include in each month's Shop and Power expense it is necessary first to close out the previous month's prepaid expense charges of Repairs, Replacements, etc., in order to obtain the charges applicable to Shops and Power.

Repairs.—The amount of each month's repairs are charged to the Repair Account and then a journal entry is made for the total operating repairs of each month as shown by summary of cost segregations, and which are chargeable to the month's operations, as follows:

Ore Extraction	$2,397.17	
Power	1,566.98	
Ore Transportation	138.80	
Reserve for Accidents	6.50	
To Repairs		$4,109.45

These general charges are posted to the general ledger and the detail charges are posted direct from cost summaries to the cost ledger.

While repairs are shown as a prepaid expense, they are, as a rule, charged out in the same month in which they were created unless the repair charge is not completed in one month, in which case it is carried in the Repair Account until completed and then charged out.

Replacements.—When the Depreciation charge is based on an average life of equipment the amount of replacements necessary to prolong the average life of each item of equipment to the length of life estimated is charged to operation.

The total operating replacements as shown by summary of cost segregations of the previous month is charged to operation by journal entry and is posted to general ledger, as follows:

Ore Extraction	$ 326.45	
Power	1,044.76	
To Replacements		$1,371.21

closing out previous month's replacements. When a replacement requires more than 1 month to complete, it is not charged out until the job is finished.

Unexpired Insurance.—When the Fire, Boiler and other insurance is paid the first of each year, the total amount for the year's insurance is charged to Unexpired Insurance and each month one-twelfth of the amount is closed out to Operating Expense, as follows:

Operating Overhead	$109.30	
To Unexpired Insurance		$109.30

the month's proportion of Property Insurance.

Suspense.—Charges are made to Suspense for advances to agents or employes of cash, and when the account of the advance is turned in a voucher is made showing the proper distribution and is entered in the Bills Audited Record and a cheque for the proper amount is drawn payable to the company and shown in the Cash Book to the Credit of Suspense. All other charges or credits to Suspense are on account of oversights in compiling, or are accounting error and are cleared the following month, or when corrected by journal entry.

DISTRIBUTION OF DEFERRED DISBURSEMENTS

The Deferred Disbursement charges of Depletion of Mine and Depreciation of Equipment are not distributed but are charged direct to Profit and Loss Account.

The Reserve for Depletion of Mines is transferred at the end of the year to the Administrative books. The Reserve for Depreciation of Equipment is kept upon the Operating Books, and whenever any unit of the original equipment is discarded and new equipment is purchased to take its place, a charge is made to Reserve for Depreciation of Equipment, offset by a credit to the old equipment account, for the amount of cost of the original equipment renewed, as shown by the books.

The amount of the new equipment should not be charged direct to Reserve for Depreciation, as by so doing the old account is not closed out and a record of the new equipment would not be shown in the equipment account.

The amount of the new equipment should be charged to a new equipment account and if the cost is in excess of the old equipment, only an amount equal to the cost of the equipment replaced should be charged Reserve for Depreciation.

If the equipment at one shaft or mine is abandoned the amount of the depreciation reserve against such equipment can be utilized to take care of the purchase of new equipment elsewhere, or it can be transferred to the Administrative Books and distributed as Capital Dividends, tax

free, if so desired, as provided in Article 1549 of Treasury Department Regulations No. 45.

MISCELLANEOUS CREDITS AND CHARGES

Occasionally work done in some one of the operating departments is not chargeable to production or company operations. In such cases credits are given the proper operating department by a charge to Accounts Receivable and the subsidiary accounts are shown on the operating journal along with general accounts, as follows:

Accounts Receivable	$ 63.26	
D. A. C. Co	$ 63.26	
To Operating Overhead, Employment Office		63.26
"Amount of present month's employment office expense chargeable to D. A. C. Co., as per cost segregations."		
and		
Accounts Receivable	$149.35	
D. A. C. Co	$149.35	
To Ore Extraction		149.35
Assaying	149.35	
"Amount of present month's assaying chargeable to D. A. C. Co., as per cost segregations."		

These entries really cover Sales of service and technically should be treated as Sales entries. However, in practice they are generally considered as disbursement credits.

Sometimes after an invoice for materials purchased has been discounted, or paid in regular course, it is found that an over-payment has been made on account of shortage in the shipment, or error in invoice extension, or failure to subtract freight, etc. In such cases, material stocks are credited and charge made against the seller through Accounts Receivable.

Also, when a credit has been taken on account of a supposedly overcharge in price or minus quantity of materials, or amount of freight, it is found that the credit was taken in error, a charge to the account that was credited must be made and the person, firm or company charged must be credited, as follows:

Materials and Supplies	$9.41	
Oils and Greases	$9.41	
To Accounts Receivable		9.41
Bill No. 352	9.41	
"Amount of freight charged to A. A. P. P. Co. in error."		

SUMMARY OF DISBURSEMENT BALANCES

A summary of the balances of the Disbursement Accounts could be taken from the ledger now that all disbursement entries have been made. However, such a statement would be of little value due to the fact that

only the disbursement part of the period's business had been entered upon the books and that some of these entries involved the results of previous periods.

Therefore, the accounting for Production, Sales, Receipts and Cash must be completed before compiling a statement of the condition of operations.

However, in order to summarize the different departments of Operting Expense so as to condense and simplify the operating statement to be made showing the condition of the business, a closing entry is made, as follows:

Ore Extraction	$56,859.91	
Ore Transportation	3,125.77	
Ore Treatment	30,840.92	
Operating Overhead	15,697.76	
Bullion Freight and Refining	14,320.45	
Selling	3,992.35	
Total Operating Expense		$124,837.16

"Closing out Departmental Operating Expense for the month to Total Operating Expense Account."

We have now taken care of our Disbursement Accounting and are ready to proceed with the accounting of Production, etc.

CHAPTER IX

PRODUCTION

When a mine has entered the production stage, a record must be kept of the mine product from the time that it is mined as a raw material until it is refined and made into a finished product ready for sale, and it is required that the different production departments of mining, milling, smelting and refining shall keep the Accounting Department advised of the progress of production from the time the broken ore is sampled until the finished product is delivered to the Sales Department.

PRODUCTION ACCOUNTS

Mine Production usually consists of three classes:
Principal Production,
By-products from Principal Production, and
Secondary Production.

Some mines produce only one product, others produce by-products, such as gold and silver along with the principal product of copper or lead, etc., while other mines will have a principal product with by-products and will also produce a secondary product which may be handled in the company's reduction works or shipped to custom smelters.

As the production is created a record of it is made upon the books by accounts as shown on Chart VIII.

As a guide in determining the accounts that are to be kept and the forms that will be necessary to properly record the product in its different stages, a Production Chart (No. IX) should be drawn showing the product in the operating stages of which a record will need to be kept. When this has been done it can be clearly seen what accounts and forms it will be necessary to create.

INVENTORY OF PRODUCTION

As a rule the mine production of crude ore is carried upon the books at cost of production, also the mill production of concentrates is carried at cost. However, the smelter production of blister copper or lead as well as the unsold refined metal is usually carried at an inventory price of an even figure during the year to simplify the accounting and adjusted at the end of the year to actual cost or market whichever method has been adopted.

OPERATING

PRODUCTION (3)	
Debit Accounts	Credit Accounts
Ore on Hand at Cost Ores in Process Unsold Copper at Inventory Gold and Silver at Inventory Special Ores at Inventory	Ore and Bullion

SALES (4)	
Debit Accounts	Credit Accounts
Sold Copper in Transit Undelivered-sold Copper Oversales	Future Sales Contracts

RECEIPTS (5)	
Debit Account	Credit Account
Due for Copper Shipped Due for Gold and Silver Due for Special Ore Shipments Estimated Loss on Deliveries	Copper Sales Deliveries Gold and Silver Sales Net Special Ore Sales Refunds and Discounts Sales Agent Reserve for Loss on Deliveries

CHART VIII.

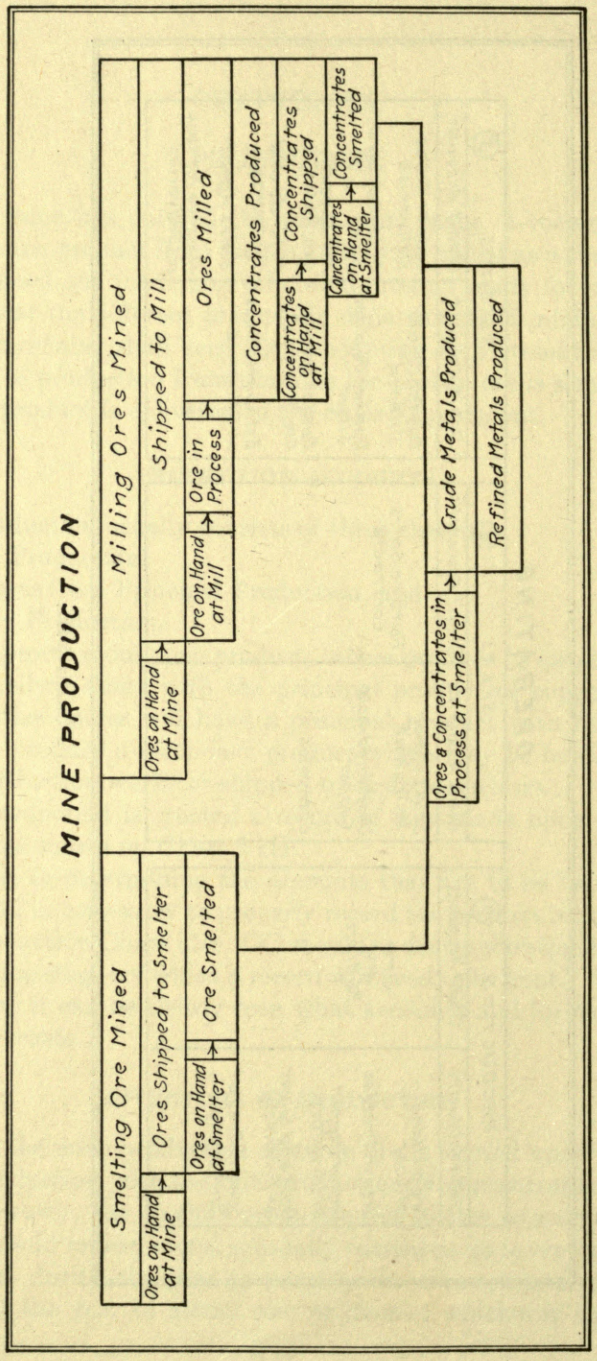

MINE PRODUCTION
Smelting Ore Mined
Ores on Hand at Mine
Ores Shipped to Smelter
Ores on Hand at Smelter
Ore Smelted
Milling Ores Mined
Ores on Hand at Mine
Shipped to Mill
Ore on Hand at Mill
Ore in Process
Ores Milled
Concentrates Produced
Concentrates on Hand at Mill
Concentrates Shipped
Concentrates on Hand at Smelter
Concentrates Smelted
Ores & Concentrates in Process at Smelter
Crude Metals Produced
Refined Metals Produced

CHART IX.

When there is a large amount of unsold metal at the end of the fiscal year, and the market is declining and dull, to inventory the metal at the market, or near thereto, would result in showing the year's operations as greater than could reasonably be expected to be obtained. Therefore, the unsold production should always be carried at cost, or at an inventory price sufficiently under the market as not to show a fictitious profit at the end of the year when there is a large percentage of the year's production unsold.

Regardless of the method used in inventorying the unsold production for monthly information of the Manager, the inventories will have to conform to the requirements of the Treasury Department in making Returns for Federal Taxes at the end of each year.

PRODUCTION METHODS

In mining there are two production units of measurement:

The Mine Unit, and

The Content of the Mine Unit or Marketable Unit.

The Mine Production Unit is inveritably the short ton. The Content Unit is the marketable unit of pound, ounce, etc., on which a price is quoted, and product sold.

The final production cost is based on the market unit, although the costs at the mine, mill and smelter are usually figured on the mine unit of a ton. Therefore, it is necessary to determine the content or marketable unit as soon as practicable in order to know the actual marketable production for each period of operation.

There are in practice at present, three methods of determining the production for the period of operation:

1. The recoverable contents of mined ores sampled at smelter.
2. The recoverable contents of mill concentrates sampled at smelter.
3. The recoverable contents of blister production of smelter.

The character of the ore and the method of treatment determines which method of determining production is used. However, in each of these methods the amounts of "Ores Mined and On Hand," "In Transit," or "In Process" are carried in suspense at cost. The first method is the one mostly used as it is the one applicable to mines producing direct-smelting ores and will be the method used in the illustrations to follow.

MINE PRODUCTION

The Accounting Department's record of the ores mined begins when the ore is withdrawn from the chutes and placed in the shipping bins. As the ores are withdrawn from the stope chutes, or as mucked from development headings or prospects, a grab or chute sample is taken from each car and placed in the chute sample box at each chute, and

the number of cars taken are pegged on the board at each chute. These chute samples are then collected each day by the production sampler who makes out a sample tag showing the date, character and cars of ore, the level number, the stope number and the chute number, as well as the metals for which assays are to be made. This sample tag accompanies the ore to the assay office where the ores are assayed, and the information on the card as to the quantity and assay value of ore that has been dumped in the shipping bins is compiled.

ASSAY REPORT

SHATTUCK-ARIZONA COPPER COMPANY

CHUTES _____, 192

CARS	GRADE	PLACE	LEVEL	OZ. AU.	OZ. AG.	% CU.	UNITS	% PB.	UNITS	INS.
12	Hi-Grade	3 Stope Ch 120	400	.02	54.4	43.4				
12	" "	" " 3-7	"	.02	50.4	43.7				
3	Oxide	5 " 23 xc	200	.02	26.4	6.0				
25	Hi-Grade	10 " Ch 145	400	.02	48.0	19.8				
4	" "	1 " " 120	900	.01	14.4	11.6				
44	Oxide	19 " " 193	500			11.5				
31	"	21 " " 177	500			9.9				
37	"	59 Prosp. " 189	500			13.9				
26	"	8 Stope " 104	600			23.1				
16	"	11 " 8 xc	"			8.1				
29	"	2 " Ch 223	300			13.4				
45	"	12 " " 195	"			12.9				
23	"	" " " 212	"			11.8				

C.E.WHITE

Assayer.

FORM 19.

REPORT OF MINE PRODUCTION

As the samples of each day's mine production are assayed, there is listed on Form No. 19, in order first as to level and next as to stope and chute numbers, the information necessary to determine the production and value of production from each stope or place in the mine from which

ore is being produced, and a copy of this report is sent to the Accounting Department for its information in recording the mine production on Form No. 47 and for the use of the Cost Accounting Department in determining tonnage costs.

REPORT OF ORES LOADED AND SHIPPED

As the ores are loaded from the bins into railroad cars, the cars are tagged and a report of each railroad car loaded is sent to the Accounting Office, and each day the Accounting Office makes a report to the smelter

SHATTUCK ARIZONA COPPER COMPANY

REPORT OF ORE LOADED

Bisbee, Arizona,.....

Calumet & Arizona Mining Company,
Douglas, Arizona.

Gentlemen: We are today shipping the following cars:

INITIAL	No.	GRADE	OUR LOT No.	

Yours truly,
SHATTUCK ARIZONA COPPER CO.

By_____

FORM 20.

(Form No. 20) of the total number of cars of ore shipped. As soon as the Weight and Moisture Certificate (Form No. 21) is received from the smelter, and the smelter sampler's report (Form No. 22) is received and checked against the Weight and Moisture Certificate, the Record of Ore Shipments to the Smelter (Form No. 23) is written up from the information contained on Forms No. 20, 21 and 22.

The matter of correct weights of ore shipments is a very important item, and means of checking the scale weights should be devised to protect against under weighing.

At the end of each month the Ore Shipments Record is balanced and reconciled with the smelter record so as to show tonnages of ores shipped and on hand at mine and smelter, and a journal entry is made for the ore on hand, as follows:

Ores on Hand at Cost	$5,352.80	
To Ore and Bullion		$5,352.80

"287.504 Dry Tons of ore on hand at end of month at mine, and 277.777 Dry Tons of ore at smelter at cost."

CALUMET & ARIZONA MINING CO.

SMELTER DEPARTMENT

WEIGHT AND MOISTURE CERTIFICATE

Douglas, Arizona, _____ 191__

SHATTUCK-ARIZONA MINING CO., Bisbee, Arizona

GENTLEMEN: We report the following ore received:

CAR No.	CAR In'l.	Date Received	LOT NO. Smelter	LOT NO. Mine	WEIGHT Gross	WEIGHT Tare	WEIGHT Net	MOISTURE Determined	MOISTURE Corrected	WEIGHT Dry Ore
1592	AW	10/3			153500	44260	109240			
1650	"	"			147200	44280	102920			
1949	"	"			153980	45880	108100			
1603	"	"			138500	43940	94560			
			58 W	161	593180	178360	414820	6%	6 36	388438
			Sampled 10/31/20.							194 219

Yours very truly,

CALUMET & ARIZONA MINING CO.

Smelter Clerk

FORM 21.

At the same time these accounts are cleared of the ore on hand, the first of the preceding month by entry, as follows:

Ore and Bullion	$7,352.25	
To Ores on Hand at Cost		$7,352.25

"Amount of ores on hand at mine and smelter the first of previous month."

Instead of recording the ores on hand at cost there could be carried in an Ore Production Account and the total ore production at cost could be charged to this account at end of each month or period, and credit for the amount of ore smelted or treated could be made which would give the same results as inventorying the Ores on Hand at end of each accounting period, as illustrated above.

However, as it is more difficult to record the Ore Production by the latter method, it is seldom used.

Next in order it is necessary to determine the contents of the ores treated or smelted in order that the mine production can be ascertained.

SHATTUCK ARIZONA COPPER CO.
SAMPLER RECORD

Date Shipped 6-11-1919 Kind of Ore Oxide Lot No. 54

Weather Conditions During Transit Fair Date Received 6 - 13 - 1919

Date Sampled

ORE RECEIVED

CARS		WEIGHTS		
INITIAL	NO.	GROSS	TARE	NET
	1598	11112	4390	6722
TOTALS				

MOISTURE DETERMINATION

	DATE	TIME A. M.	TIME P. M.	TEMP.	GROSS WEIGHT
IN					
OUT					

Same as Lot 53 5.37%

Loss in Weight

Weight of Sample (lbs.)

Moisture % =

Gross Weight=Ore plus Pan's Weight

3-8 SIZE DETERMINATION

	LBS.
WEIGHT OF SAMPLE TAKEN	
WEIGHT OF OVERSIZE	
PER CENT OF OVERSIZE	

METALLICS

TOTAL AMOUNT OF PULP SAMPLE	OZ.
TOTAL AMOUNT OF PULP SAMPLE	GR'MS
AMOUNT OF METALLICS, GROSS	GR'MS
ASSAY OF METALLICS	PER CENT
AMOUNT OF METALLICS, NET	GR'MS
RATIO =	PER CENT =

REMARKS: This is a part car of lot 53, which did not arrive with that Shipment, as it is difficult to secure a fair sample from such a small lot. By arrangement with Mr. Cole sample of Lot 53 applies to this Lot 54.

COMPARATIVE ANALYSIS

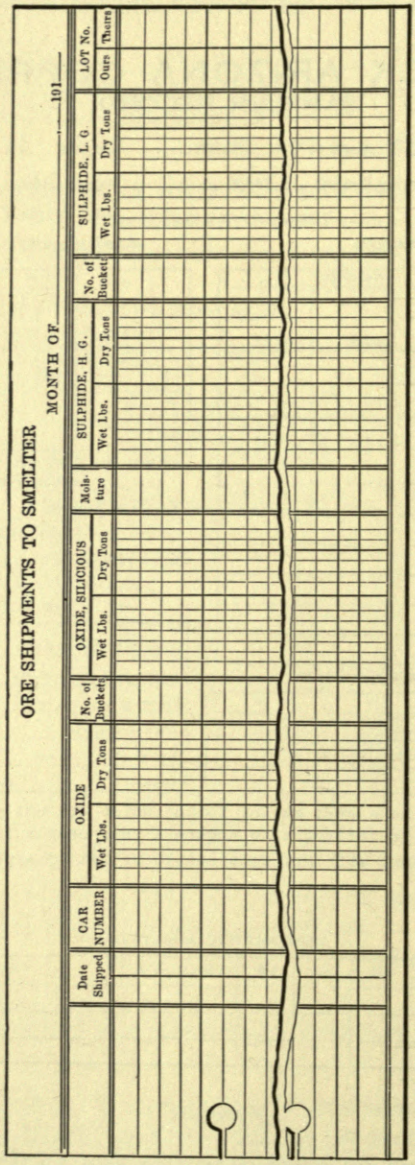
SAMPLE OBTAINED	CU.	AU.	AG.	PB.	INSOL.	H_2O	REMARKS
TRAM GRAB							
PULP SAMPLE							
RE-SAMPLE							

FORM 22.

CONTENTS OF ORES SAMPLED FOR TREATMENT

At the time that the moisture sample is taken of each lot of ore received at the mill and smelter, an assay sample is also taken. This sample is then generally reduced by crushing and quartering to about

2 lb. and then is divided into four portions of about 9 oz. each. One of these portions is assayed by the smelter's assayer, the other by the mine's assayer, and the remaining two portions are sealed by the samplers


ORE SHIPMENTS TO SMELTER

MONTH OF _____ 191__

Date Shipped	CAR NUMBER	OXIDE			No. of Bucket	OXIDE, SILICIOUS			Moisture	SULPHIDE, H. G.			No. of Bucket	SULPHIDE, L. G			LOT No.	
		Wet Lbs.	Dry Tons			Wet Lbs.	Dry Tons			Wet Lbs.	Dry Tons			Wet Lbs.	Dry Tons		Ours	Theirs

FORM 23.

representing both mine and smelter, and are held for use of the umpire in case of disagreement between the mine and smelter as to the assay contents of each lot.

As soon as the assay content of each sample is determined each by the mine and the smelter, the assay results are recorded and a comparison is made, and if the results are within certain limits, the differences are usually split and a settlement agreed upon. If the differences in assay results are not within specified limits, repeat assays are run and recorded, and then if the differences are not within splitting limits one of the umpire samples are sent to an umpire for final determination. As soon as an agreement has been reached upon all assay contents a Settlement Assay Certificate (Form No. 24) is issued by the smelter for each lot of ore and this settlement assay together with the final assays of both mine and smelter and of the umpire, when obtained, are entered on the Settlement Assay Record of Ore Sampled (Form No. 25).

CALUMET & ARIZONA MINING COMPANY

SMELTER DEPARTMENT

SHIPPER Shattuck Oxide. DOUGLAS, ARIZ., July, 13, 1920

LOT NUMBERS		CAR NUMBERS	ANALYSIS									OUNCES PER TON	
SMELTER	SHIPPER		SiO_2 %	Al_2O_3 %	Fe %	CaO %	S %	INSOL. %	%	Met. Cu. %	COPPER %	SILVER	GOLD
3976	119	1564 1567	37.8	3.9	25.0	1.7	13.1				5.97	1.84	.019

Gates.
CHEMIST

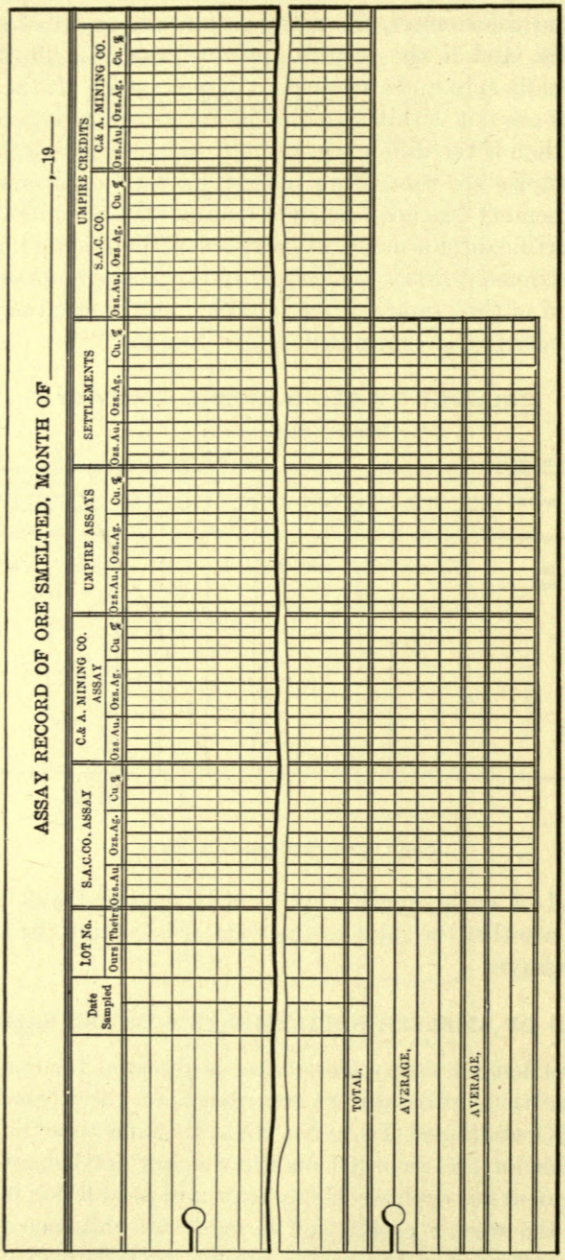
FORM 24.—Settlement Assay.

At the end of each month this record is totaled and averaged in order to show whether the mine or the smelter is getting the better of the averaging of assays.

RECORD OF SMELTER SETTLEMENTS FOR ORE SAMPLED

As each Settlement Assay Certificate is received for each lot of ore sampled, the settlement assays are recorded upon the Record of Smelter Settlements of Ore Sampled (Form No. 26) at the same time the wet and dry weights of each lot are recorded on the Smelter Settlement Sheet. As soon as settlement for each week's mine or mill production is obtained, a statement of the week's production is made up on space provided on Form No. 26 and copy of the week's production is furnished to the Production Superintendents and the Manager (Form No. 27).

At the end of the month the Record of Smelter Settlements for Ore Sampled is totaled and smelter costs and production determined accord-



ASSAY RECORD OF ORE SMELTED, MONTH OF _____, 19__

	Date Sampled	LOT No. Ours	LOT No. Their's	S.A.C.CO. ASSAY Ozs.Au.	S.A.C.CO. ASSAY Ozs.Ag.	S.A.C.CO. ASSAY Cu. %	C.& A. MINING CO. ASSAY Ozs.Au.	C.& A. MINING CO. ASSAY Ozs.Ag.	C.& A. MINING CO. ASSAY Cu. %	UMPIRE ASSAYS Ozs.Au.	UMPIRE ASSAYS Ozs.Ag.	UMPIRE ASSAYS Cu. %	SETTLEMENTS Ozs.Au.	SETTLEMENTS Ozs.Ag.	SETTLEMENTS Cu. %	UMPIRE CREDITS S.A.C. CO. Ozs.Au.	UMPIRE CREDITS S.A.C. CO. Ozs Ag.	UMPIRE CREDITS S.A.C. CO. Cu. %	UMPIRE CREDITS C.& A. MINING CO. Ozs.Au.	UMPIRE CREDITS C.& A. MINING CO. Ozs.Ag.	UMPIRE CREDITS C.& A. MINING CO. Cu. %

Smelter Settlements for Ore Sampled for _____ During Month of _____

Date Sampled	Lot No.	Wet Pounds	% Moisture	Dry Pounds	Dry Tons	ASSAY PER TON ORE				TOTAL CONTENTS			Smelter Losses Lbs. Cu.	Net Pounds Copper	TREATMENT CHARGES			
						Ozs. Au.	Ozs. Ag.	% Cu.	% Ins.	Ozs. Au.	Ozs. Ag.	Pounds Copper			Smelting	Mst. Per.	Insoluble Penalty	Total Amount

FIRST PERIOD	DUE	WARRANT NO.
Ozs. Au. × 95 % =		Ozs.
Ozs. Ag. × 90 % =		Ozs.
Pounds Copper		
Ref. & Frt. Losses =		Pounds

THIRD PERIOD	DUE	WARRANT NO.
Ozs. Au. × 95 % =		Ozs.
Ozs. Ag. × 90 % =		Ozs.
Pounds Copper		
Ref. & Frt. Losses =		Pounds

SECOND PERIOD	DUE	WARRANT NO.
Ozs. Au. × 95 % =		Ozs.
Ozs. Ag × 90 % =		Ozs.
Pounds Copper		
Ref. & Frt. Losses =		Pounds

FOURTH PERIOD	DUE	WARRANT NO.
Ozs. Au. × 95 % =		Ozs.
Ozs. Ag. × 90 % =		Ozs.
Pounds Copper		
Ref. & Frt. Losses =		Pounds

MONTH'S PRODUCTION		
Ozs. Au. @ $20.00		
Ozs Ag. @		
Pounds Fine Copper Deliverable Month of		Lbs.
Month of		Lbs.

Ore Freight	Wet Tons @	c Plus War Tax %
Treatment	Dry Tons @	c Plus War Tax %
Refining	Tons Fine Cu. @	
Bullion Freight	Tons Fine Cu. @	
War Tax	Tons Fine Cu. @	
Total Bullion Freight and Refining		

FORM 26.

ing to schedule, and a record is made upon the books for the principal product by a journal entry, as follows:

Unsold Copper	$106,180.00	
To Ore and Bullion		$106,180.00

"Amount of recoverable copper in ores sampled at smelter during the month figuring copper at 12½ cts. per pound."

This records the amount of the recoverable principal production from the mine product, upon the books at an average figure.

STATEMENT OF WEEKLY PRODUCTION
AUGUST, 1920

	Wet Tons	Per Cent, Mois.	Dry Tons	Recov. Per Cent, Cu	Lbs., Copper	Ozs. Au	Ozs., Ag
1st Period	334.340	5.88	314.687	5.42	34,133	9.19	1,193
2d Period	549.640	5.45	519.674	5.35	55,547	15.30	1,442
3d Period	331.050	4.99	314.542	6.55	41,476	15.77	1,428
Total	1,215.030	5.44	1,148.903	5.71	131,156	40.26	4,063

FORM 27.

As the unsold copper is sold the above production must be reduced an amount equal to the portion sold, which is taken up in the Sales Accounts at the selling price.

If the principal production is determined from the amount of blister copper produced by the smelter each month, then the record of the principal production will be based upon the amount of recoverable copper in the blister copper.

PRODUCTION RECORD OF BY-PRODUCTS

The smelter product of the principal production usually carries by-products of precious metals, the recoverable contents of which must also be recorded upon the books, as shown by Production Sheet No. 26, if based on contents of ores sampled, or by Form No. 32, if based on contents of smelter production.

The recoverable by-products having been determined they are usually taken up on the books at an inventory price below the present market, or at the average market price of the previous month, by a journal entry, as follows:

Due for Gold and Silver..... $10,631.70
To Gold and Silver Sales..... $10,631.70

"For 105.86 oz. gold at $20.00 and 9,599 oz. of silver at 88.702 cts., being the price of silver for previous month."

When silver production is paid for at a price ruling on a certain date, the month's production of silver is taken up on the books at inventory price considerably less than the present market and adjustment made upon date of settlement, as shown by Form No. 41.

THE CONSOLIDATED KANSAS CITY SMELTING & REFINING CO.
EL PASO SMELTING WORKS PLANT

El Paso, Texas, 12-8-20 192

Bought of Shattuck-Arizona Copper Co.
Shipping Point Bisbee, Ariz.
Classification Flot.
Smelter Lot 3999
Shipper's Lot F-236

CAR No.	Init.	WEIGHT IN AVOIRDUPOIS POUNDS Gross	Sacks No.	Sacks Weight	Net Weight	Moisture %	Dry Weight
7547	SF				97620	16.4	81610

Silver purchased under Pittman Act. 965 ozs.
Silver value withheld. $289.50

N. Y. METAL QUOTATIONS

	Settlement Date 11-20-20	19
Silver	99 5/8	Cts. per oz.
Lead	6.50	Per 100 lbs.
Date		
E. & M. J. Copper		Cts. per lb.
London Lead per 2240 lbs.	£ S D	
Exchange N. Y.		
Exchange Mex. Cy.		

PAYMENTS FOR METALS

Elements	Assay per ton 2000 lbs.		Deducted	Net Assay	Equivalent in lbs.	Percent. paid for	Net paid for		Rate	Amount per ton	VALUE Amount to pay
Gold	.355	Oz.						Oz.	20.00	7.10	
Silver	24.9	Oz.				95	23.655	Oz.	99 5/8	23.57	
Lead	30.8	%	1.5	29.3	586	90	527.4	Lbs.	4.75	25.05	
Copper		%						Lbs.			
TOTAL PAYMENT FOR METALS											55.72

CHARGES AND CREDITS

	DEBITS	CREDITS
TREATMENT CHARGE F. O. B. EL PASO SMELTING WORKS	4.50	
BRICKING CHARGE		

Analysis		Deduction	Net		Rate		DEBITS	CREDITS
Insoluble	%			%	@	Cts.		
Silica	22.4 %			%	@	Cts.		
Alumina	.5 %		22.9	%	@ .12	Cts.	2.75	
Sulphur	%			%	@	Cts.		
Zinc	%			%	@	Cts.		
As Sb Bi	%			%	@	Cts.		
	%			%	@	Cts.		
Iron	21.54 %			%	@	Cts.		
[illegible]	.2 %		23.54	%	@ .08	Cts.		1.88
Lime	1.8 %			%	@	Cts.		
TOTAL DEDUCTIONS							7.25	1.88
NET VALUE PER TON								50.35

					DEBITS	CREDITS
Total value on	40.805	dry tons @	50.35	per ton		2054.53
Less freight on	48.810	wet tons @	4.75	per ton	236.03	
Less war tax					7.08	
Less demurrage		Switching			2.58	
Less umpires					4.30	
Less revenue stamps						
Less duties		Brokerage				
BALANCE DUE SHIPPER					1804.54	
					2054.53	2054.53

Made by W. Checked Correct Approved

FORM 28.

PRODUCTION OF SECONDARY PRODUCTS

The production of secondary products is not, as a rule, of large volume and such production is usually carried on the books at cost until

RETURNS ON LEAD ORE SHIPMENTS

SHATTUCK ARIZONA COPPER COMPANY

MONTH OF_____ 19____

	Date Sampled	LOT NO.		WET ORE Pounds	Moisture	DRY ORE		RECOVERY								Total Smelter Returns	CHARGES			CREDITS		Net Smelter Value	Freight	Umpires Etc.	NET TOTAL
		Ours	Theirs			Lbs.	Tons	GOLD		SILVER		LEAD		COPPER			Treatment	Insoluble		Iron	Lime				
								Ozs.	Amount	Ozs	Amount	Lbs	Amount	Lbs	Amount										

settlements are received therefor from smelters or agents when they are taken up on the records at the settlement values, as shown by Form 29.

Secondary production is invariably sold to custom smelters under contract and settlements of each lot shipped are made in accordance with Form 28. A summary record of such settlements is kept as shown by Form 29, which gives all the information necessary to determine the production and the expense in connection therewith. This Form 29 is a combined production and sales record and is a very valuable form for mines selling their product direct to custom smelters.

MILL PRODUCTION

When the mine production is milled and the mill concentrates are delivered to the smelter instead of the mine ore, a separate Record of Ore Shipments (Form 23) is kept of the ore shipped for concentration,

Concentrates Shipments Record 192

Date Shipped	Car Number	Flotation			Gravity			Lot No.	Remarks
		Wet Lbs.	Dry Tons	Mois.	Wet Lbs	Dry Tons	Mois.		

FORM 30.

and a record of the concentrates shipped to smelter is kept similar to Form 30, unless the concentrates are sold to the smelter when a production and sales record is kept similar to Form 29.

It is seldom that separate mill records are kept of the different processes of mill production as crushing, tabling, grinding, flotation, etc., and when this is done such records are kept in connection with the metallurgical records and cost statistics, which are treated under those heads. However, a record is always kept of the quantity and assay contents of concentrates produced, generally one record based on mill assays and the final record based on settlement assays, in order to obtain the mill recoveries of metals in ores treated.

SMELTER PRODUCTION

It has recently become the accepted practice to treat the smelter as a separate organization the same as the refinery, even when the smelter is owned and operated by the same company and organization. The smelter handles the company's ores in a similar manner to outside or custom ores, either making a flat rate to the mines for ores of certain contents, and extra charges for variation from the agreed specifications, or

a base rate with premiums and penalties, as is the practice of custom smelters.

This enables the mine to obtain a very simple record of smelter production, either on basis of ores sampled, or of blister copper produced and leaves all the complicated smelter production and metallurgical records as part of the smelter department.

_____ 192__

NICHOLS COPPER COMPANY,
LAUREL HILL, LONG ISLAND,
NEW YORK.

On or after the deliverable date mentioned below, upon surrender of this certificate to you properly endorsed, you will deliver at your refinery, f.o.b. cars or free aboard, New York Harbor Litherage, to the order of our Sales Department, the number of pounds of copper set forth below in the form of electrolytic wire bars, cathodes, cakes or ingots as per specifications.

Lot No.	Pounds of Copper	Date of Delivery	Charges		Ounces, Gold	Ounces, Silver

A B C MINING COMPANY

_____

Secretary.

FORM 31.

When the production is determined upon the contents of ores sampled, usually a warrant against the refinery is given the Sales Department for the amount of the production, as shown by Form 31, for delivery at a date sufficiently advanced in the future to enable the treatment and refining of the metal.

When the production is based upon the recoverable contents of the blister copper produced, the order to the Sales Department is based upon the production, as shown by summarized Form 32.

TRANSPORTATION OF SMELTER PRODUCTION

Due to the fact that a refinery generally handles the product of a number of smelters, it is very seldom that the refinery is in the same vicinity of the smelter, being situated close to the consumers of copper and cheap labor and power, and therefore the smelter production must be transported to the refinery. The record (Form 32) of bullion shipped to the refinery is made up from the daily reports of weights and contents of bullion as reported from the smelter, and the freight charges are paid, as per freight tariffs. However, in order to get the complete and correct cost of each month's production, the amount of bullion freight that is chargeable against the month's production is taken up on the books, as explained under Accrued Disbursements, and as shown on Form 26.

CALUMET AND ARIZONA SMELTER

COPPER STATMENT for month of----------191

DESCRIPTION	BARS	POUNDS (BLISTER)	AVERAGE ASSAY			CONTENTS		
			Au.	Ag.	Cu.	Au.	Ag.	Fine Copper
On hand 191								
Producing during month								
TOTAL.								
Shipped during month								
On hand 191								

FORM 32.—Smelter Production Recovery.

REFINERY PRODUCTION

Very few mining companies operate a refinery in connection with their mines and smelters, and even when this is the case, the refining of the smelter production is done by contract as to price and date of delivery of the refined product. The amount chargeable for refining against each month's production is taken up on the books in advance of the actual refining, as explained under Accrued Disbursements.

The Sales Department of the company is advised as each week's production of metals is determined, and an order is given the Sales Agent (Form 31) on the refinery showing the date that same will be due from the refinery, etc., in order that the Sales Department may be informed of the amount of refined metals that will be delivered each week by the refinery that may be sold for future delivery, or will be available for spot sales.

A copy of each of these advices is kept on file by the Accounting Department, and at the end of each month there is entered on the Production and Refinery Delivery Record (Form 33), the pounds and ounces of metals produced, and the pounds and ounces of metals that will be due from the refinery, and the due dates of delivery.

PRODUCTION & REFINERY DELIVERIES
YEAR - 1917

MONTH	PRODUCTION	TOTAL LBS.	REFINERY DELIVERIES FROM PRODUCTION MONTH	POUNDS
January	1,415,303			
February	1,402,853			
March	1,518,436			
April	1,482,232	5,827,85	January	5,827,85
May	1,385,369	1,488,129	"	832,518
			February	655,611
June	956,396	1,356,502	"	714,242
			March	609,260
July	2,050,817	1,615,605	"	909,176
			April	706,429
August	644,677	1,350,069	"	775,803
			May	574,266
September	711,924	1,280,658	"	811,403
			June	469,255
October	308,518	487,141	"	487,141
			July	
November	777,616	517,602	"	205,081
			August	312,521
December	620,612	589,268	"	332,096
1918			September	257,172
January		734,538	"	454,752
			October	279,786
February		913,340	"	528,732
			November	384,608
March		646,578	"	393,008
			December	253,572
April		373,042	"	373,042
TOTALS	11,935,317	11,935,317		11,935,317

FORM 33.

CHAPTER X

SALES

On account of the sales department making the sales of and delivering. the principal product, as well as making collections therefor, the accounting records for both sales and receipts of principal product are based on reports from the sales department.

The sales of production are of three classes:

Sales of Principal Product,

Sales of Secondary Product, and

Sales of By-products.

Occasionally metal mines produce only one product, such as gold, silver, lead, copper or quicksilver, etc., the same as iron and coal mines, but as a rule most metal mines have a principal product such as, for instance, copper, with gold and silver as by-products which are extracted from the blister copper when the latter is refined and then there may be a secondary mine product such as a lead-silver ore or ores valuable only for their silica or sulphur content which are sold to custom or other smelters.

The method of selling these different products usually is not the same, depending upon the scale of operations, etc.

SALES OF PRINCIPAL PRODUCT

When the production is of sufficient quantity to justify, a sales department is maintained to sell the principal product or the principal product is sold through independent sales organizations. Sometimes the secondary products are also sold through the sales department, but as a rule the secondary products of mines and mills are sold direct to custom smelters or brokers. The by-products may be sold through the sales department, to smelters or to refiners or disposed of direct by the operating department depending upon the character and quantity and which method gives the best results.

Even when the producers maintain their own sales department such is operated separately and as a rule a fixed rate of charge is made for selling plus the actual delivery cost.

The sales department has its own cash account and keeps its own separate records of cash book, journal, general ledger, customers' ledger, etc., but closes its record of each sale when completed by a transfer of the cash received therefor to the Treasurer.

As soon as the smelter production of the principal product is determined for each week the sales department is notified of the amount and of the date delivery of refined metal will be due from the refinery. This

Adolph Lewisohn & Sons
61 Broadway
New York 19

Contract No.

Dear Sirs.

We take pleasure in confirming sale to you of this date as follows.

Quantity
Description
Price
F.O.B. / *C.I.F.*
Delivery
Payment — *In Funds current with the Banks of New York City. Or with Exchange added.*
Other Conditions

Kindly confirm the above and send us shipping instructions in due course.

Very truly yours,
Adolph Lewisohn & Sons
by

You assume all risks of delay due to strikes, differences with workmen, accidents to machinery, delays of carriers including those in the transportation of copper or supplies necessary for the treatment of copper at the mines or plants, or to any cause beyond our control. Each month's delivery shall be treated as a separate contract.

ACCEPTED.....

FORM 34.—Sales Contract.

enables the sales department to know the quantity of metal produced, in transit, and that will be available for sales delivery for each week and month in the future, as well as knowing what amount of unsold refined metal is on hand for spot sales.

As sales are made of the principal product such as copper a sale contract (Form 34) is drawn and signed in triplicate, one for the Buyer, one for the Sales Department and one copy for the Accounting Department. Upon receipt of the triplicate copies by the Accounting Department a record is made of each sale in numerical order as to sale numbers (Form 35), which record is closed for each month, and the amount is taken up on the books by a journal entry, as follows:

Sold Copper in Transit	$122,291.65	
Monthly Sales	$122,291.65	
To Future Sales Contracts		$122,291.65

"520,390 lb. of copper sold against copper in transit, as per Monthly Sales Sheet."

When the amount of the copper sold each month is taken up on the books it is necessary to reduce the amount of the unsold copper a like number of pounds, and therefor an entry must be made to reduce the unsold copper carried on the books, as follows:

Ores and Bullion	$67,937.88	
To Unsold Copper		$67,937.88

"To clear the books of 520,390 lb. of copper sold in January, and 23,113 lb. of Over-sales for March."

Occasionally it is considered best to sell against future production and when this is done the sales are recorded upon the sales sheets the same as regular sales, and a charge to Over-sales is made by journal entry, as follows:

Over-sales	$235,000.00	
Monthly Sales	$235,000.00	
To Future Sales Contracts		$235,000.00

Sold against future production June 500,000 lb. at 23.5 cts.

Sold against future production July 500,000 lb. at 23.5 cts.

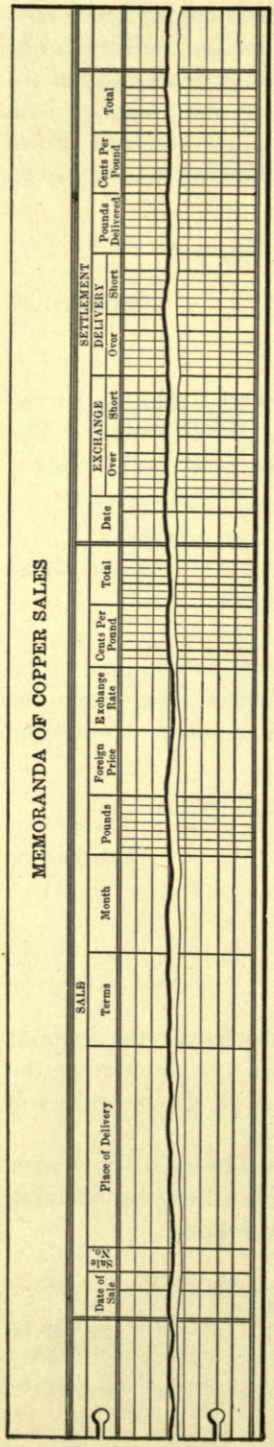
As shown by January Sales Sheets.

However, when a statement is taken from the ledger the amount of the Over-sales on the books are deducted from the amount of the Future Sales Contracts in order that the statement of the business will show the true condition in assets and liabilities.

As the production from mine and smelter gives refinery deliveries for the months against which over-sales have been made entries transferring the sales from the Over-sales Account are made, as follows:

Sold Copper in Transit	$6,059.60	
Monthly Sales	$6,059.60	
To Over-sales		$6,059.60

"23,113 lb. of March Over-Sales closed out by production deliveries."



FORM 35.

Copper Sales Sheet (Form 35) provides for a record of the settlement of each sale in order that there may be an accurate check of the price, pounds, and date of delivery of each sale. However, it is not necessary to have this information on the Sales Sheet.

SALES OF SECONDARY PRODUCTION

Numerous small producers sell their mine and mill products direct to custom smelters, and, also, as a rule, large producers of any particular mine product sell their secondary mine and mill production to custom smelters under contract. When this is done the Sales Record is combined with the production record as shown by Form 29, which gives a very concise and complete record of production and sales.

When the mine and mill product is disposed of in such manner the production and sales records may be handled by one of two methods. The first method is simply to carry the ore and concentrates for which settlements have not been received as "On Hand at Cost," and figure the monthly production and costs from the Smelter Settlements, as shown by Form 29.

The second method is to charge an Ore Production Account with the total expense of producing the ores, and charge an Ore Milling Account with the amount of expense of milling ore. Then to charge a Metal Production Account with the proportion of Ore Production Expense and Milling Expense that is applicable to the concentrates for which settlements have been received from the smelter, as shown by Settlement Sheet Form 29.

The second method gives an accurate cost, while the first method gives an arbitrary cost, which after the first several months of production, will be fairly accurate, provided the monthly expense and production is uniform from month to month. The first method is more often found in use by small producers who do not realize the need of accurate records.

SALES OF BY-PRODUCTS

The disposal of by-products in the principal production, such as gold and silver, if copper is the principal product produced, is sometimes made by the sales department to the mint or to consumers, but generally such by-products are purchased by the refiners who make settlements therefor upon assay contents of the bullion before refining.

Either the sales value of by-products, or an inventory price is used in taking them upon the books and this entry is usually made at the time of production, as was illustrated under Production Accounting. To use a nominal price in the inventory from month to month enables the accounting and bookkeeping to be done without delay.

When the mine or mill production is sold to custom smelters, the by-products are purchased along with the principal content in the ore or concentrates, as shown by Form 29.

SALES OF OPERATING SUPPLIES, ETC.

Occasionally sales of operating supplies are made from warehouse stocks, as well as sales of obsolete equipment and of power, air, water, shop labor, or operating service such as assaying, engineering, etc. to accommodate others.

Such sales are made upon authority of the manager or the authority of the department head responsible, and are carried in the Accounts Receivable Account.

All such sales of supplies and of unused equipment show as a credit to the Supply Accounts or proper Equipment Account, etc., and do not show upon the Monthly Operating Statement.

All sales of discarded equipment that had been charged to Operation and replaced with new equipment are credited to Refunds and Discounts "Old Materials Sold," while all sales of power, air, shop labor and services are credited to the proper Operating Department and the credit is shown on the Monthly Operating Statement.

All sales of operating supplies, etc. are carried in the Accounts Receivable Account, while the sales of production are carried in regular Sales Accounts, as shown by Chart 8, and are transferred to Receipt Accounts as the sales are delivered to transportation agents for delivery to customers.

UNDELIVERED SOLD PRODUCTION

Occasionally, due to railroad strikes, war, or other causes interferring with delivery of sold production, it is impossible to make delivery of sales to customers, and when these undelivered sales are of large volume it is best to close them out of the "Sold Metal in Transit" and carry them as

"Undelivered Sold Metal" in order that the Statement may show the amount of sold products that cannot be delivered.

Before closing the books at the end of the year it should be decided whether or not the sales of metal in transit and undelivered sales are to be inventoried at cost or carried at the sales price.

In making returns for purpose of Income Tax, the Undelivered Sales will have to be inventoried at cost, unless it can be shown that the product was on hand ready for delivery, and it was the desire of the purchaser, that the delivery should be made at a later date, or that inability to deliver was due to the transporting agent.

CHAPTER XI

RECEIPTS

When the accounts are kept upon an accrued basis it is necessary to take up on the books the receipts as they are created regardless of whether or not payments of cash have been received therefor.

It is difficult for some persons to understand how there can be a receipt unless there has been an actual payment in cash or collateral, although they can understand why an accrued disbursement should be taken up on the books before there has been an actual disbursement of cash, and therefore some firms will keep their records of disbursements on an accrued basis but will keep their records of receipts upon a cash basis. However, when this is done the accrued revenue is not shown on the books, and a statement of the business does not show the actual condition of the business.

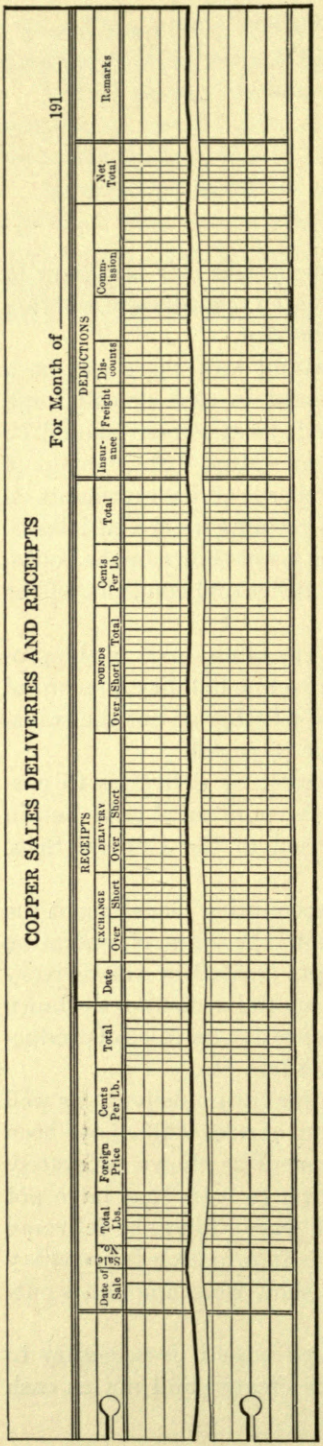
Therefore, whenever there has been a delivery of any part of the production to others, or there has been created a revenue liability a record of it should be made upon the books regardless of whether or not the transaction was for cash upon delivery or upon time payment.

In a commercial business the receipts created by deliveries to customers are carried in an Accounts Receivable Account until paid, and in the mining business such an account is carried in the General Sales Ledger of the Sales Department.

However, upon the General Books in the Accounting Department the Accounts Receivable Account is used to show the sales of operating supplies, operating labor, etc., while the receipts created by the delivery of sold production to customers are carried in special accounts, as shown by Chart VIII. This is done to show the amounts due for sales of production separate from sales of operating supplies, labor, etc.

As the sales of metal production are made for future delivery as well as for spot, it is highly desirable that that portion of sales which have been delivered to transporting agents and to customers be shown separately as being in the receipt stage in contradistinction to sales that have not been delivered and may be cancelled before delivery or fail to be delivered on account of some future contingencies. This information is necessary in order that a statement of the business may show what amount is outstanding on delivered production.

Also, as the books are kept upon an accrued basis it is necessary to take the receipts upon the records as they are created and not as cash



FORM 36.

payments are received as is done when the books are kept upon a cash basis. Of course, even when the books are kept on an accrued basis it is customary to handle the small cash transactions upon a cash basis in order to avoid unnecessary bookkeeping.

DELIVERY OF SALES OF PRINCIPAL PRODUCT

A record is made by the Sales Department of each sale to customers at the time the sales contract is drawn.

This record of Sales Contracted is for the guidance of the Sales Department. However, a sale is not charged upon the Sales books against a customer until shipment is made, and a contracted sale is not usually taken up on the General Books as a receipt until the Sales Department makes the delivery.

Therefore, either during the month, or at the end of the month, a record is made up on the General Books of receipts created by the delivery during the month of sold products by the Sales or other departments, regardless of whether or not payments have or have not been received for such deliveries.

The record of copper deliveries each month is shown by the Copper Sales Deliveries Sheet (Form 36) using one Delivery Sheet for each month and the total amount of this Sheet is taken up on the General Books at the end of the month by a journal entry, as follows:

Due for Copper Shipped.....	$204,701.26	
Monthly Sales Deliveries..	$204,701.26	
To Copper Sales Deliveries.....		204,701.26

"Amount of copper delivered to customers in January against contracted accounts as per Delivery Sheet."

As deliveries are made a reduction of like amount must be made in the Sales Accounts in order that the records of sales may be correct and that the amount of the Company's assets will not be over-stated. Therefore an entry is made to accomplish this, as follows:

Future Sales Contracts	$204,701.26	
To Sold Copper in Transit		204,701.26
Monthly Sales	$204,701.26	

"Reducing the sales an amount equal to the deliveries made during the month, as shown by Delivery Sheet."

RESERVE FOR LOSS ON SALES

The Sales Department is supposed not to make any sales to customers whose credit is doubtful, and it is expected that they will watch their accounts and collections and protect their shipments by insurance so as to avoid any loss.

However, some catastrophe may result in a full or partial loss of an account or make it doubtful that the full amount of a receipt will be collected. In such cases the receipt in question should be carried at its sales value but a reserve should be set up on the books of an amount considered sufficient to offset any probable loss.

This is done by debiting an account "Estimated Loss on Deliveries" and crediting "Reserve for Loss on Deliveries," and in making up the Operating Statement the amount of the "Estimated Loss on Deliveries" will not show on the statement except as deducted from the amount of the "Copper Sales Deliveries," if it is a sale of copper, the net amount being extended to the balance column. The account reserve for loss on deliveries is charged with the actual loss when determined. If the loss does not occur as anticipated the amount of the reserve set up therefore is cleared from the books by reversing the entry.

OVERS AND SHORTS ON DELIVERIES

It is not always possible to deliver the exact amount of pounds of metal as called for under the sales contract on account of the different shapes as ingots, cakes, bars, or cathodes being of certain weight. Therefore, as a rule there is generally a few pounds more or less delivered for which adjustment is made with the customer upon settlement of each sale. At the end of each month the amount of the overs and shorts are totaled and adjusting entries are made upon the books to the proper accounts.

In case of over-shipment the first adjustment is to the Receipt Account, as follows:

Due for Copper Shipped	$418.42	
Overs and Shorts	$418.42	
To Copper Sales Deliveries		418.42

"The amount that overs exceed shorts on deliveries made against October Account, as shown by Delivery Sheet amounting to 1,465 lb."

The second adjustment is to the Unsold Copper Account:

Ores and Bullion	$183.12	
To Unsold Copper		183.12
Unsold Copper in Transit	$183.12	

"Reducing the amount of unsold copper at inventory price to offset 1,465 lb. of copper delivered over against October deliveries."

In case the deliveries are short for any month the entries would be the reverse of those shown above for over-deliveries.

DELIVERY OF SALES OF BY-PRODUCTS

In the case of copper mines the by-products are usually gold and silver, and the sale of these is generally made to the refinery unless the company owns its own refinery, when, of course, they would be sold either to the United States Mint or in the open market.

When the by-products are sold in the open market or to the Mint they are taken up on the books when the production entries are made and carried on the books at inventory prices below the usual market, and as sales are made the amount of the sales are entered upon the books and the production accounts are reduced an amount of ounces at inventory price equal to the amount of ounces sold, the same as done with copper sales.

When the by-products are sold to refiners or direct to custom smelters the contract states the amount that shall be paid for same, and the by-products may be taken up on the books at contract price as produced, as shown by entry under Production Accounting, and not passed through the Sales or Receipt Accounts. This can be done even when the by-products are taken up in the Production Accounts at estimated figures, the amount of actual settlement being treated as Cash Receipt and the amount standing in the Production Accounts at inventory price being closed out. This method saves bookkeeping and is allowable when the by-products are not large.

DELIVERY OF SECONDARY PRODUCTS

The sales of secondary products are handled in the same manner as metal sales if sold direct to consumers. If sold to custom smelters they are carried on the books at cost until settlements are received when the proper amounts are taken up on the books the same as a Cash Receipt and the amount of the cost of inventory value is written off.

If the Secondary Production is large and is not quickly turned into cash, it would be best to carry it through the Sale and Receipt Accounts the same as the principal production.

MISCELLANEOUS RECEIPTS

Miscellaneous receipts such as cash discounts, freight and purchase refunds, etc. are as a rule treated as cash receipts and are not carried in the Sale or Receipt Accounts but are entered as the cash is received therefor and will be illustrated under "Cash."

In practice to save bookkeeping it is not customary to take up the delivery of Secondary Production and Miscellaneous Receipts into the Receipt Accounts, although this would be theoretically correct and can be done if desired.

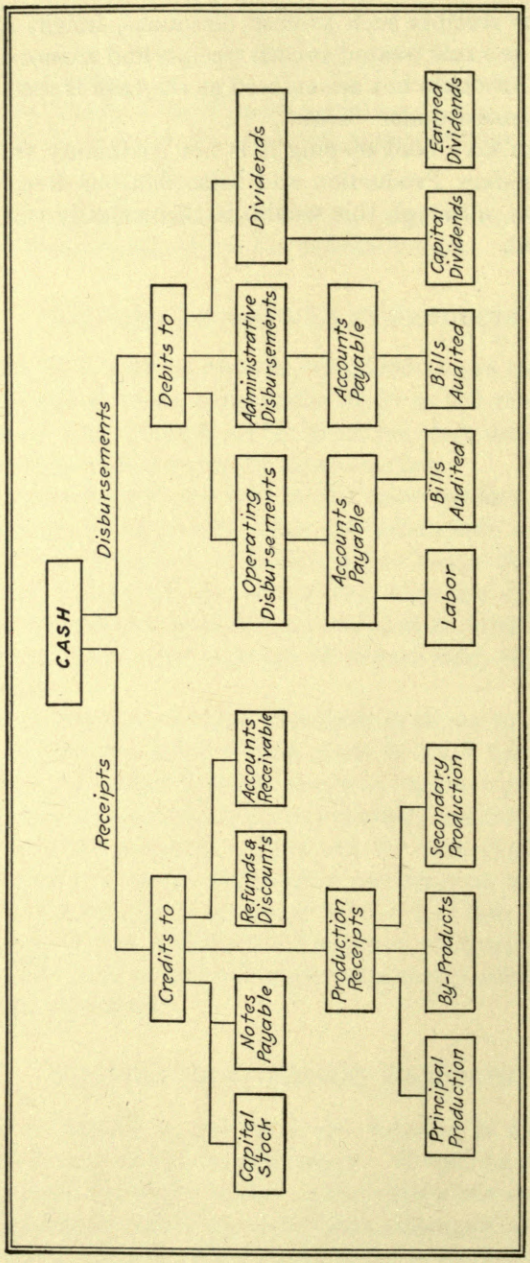

CASH
Receipts
Disbursements
Credits to
Capital Stock
Notes Payable
Refunds & Discounts
Accounts Receivable
Production Receipts
Principal Production
By-Products
Secondary Production
Debits to
Operating Disbursements
Administrative Disbursements
Dividends
Accounts Payable
Labor
Accounts Payable
Bills Audited
Accounts Payable
Bills Audited
Capital Dividends
Earned Dividends

CHART X.

CHAPTER XII

OPERATING CASH

Generally there is only one account for Cash in the General Operating Ledger, with sometimes a Petty Cash Account. Usually the cash is deposited in one bank so that the Cash and Bank Account are the same. As a rule there is only one record for operating cash transactions, a Cash Book, or sometimes known as a Cash Journal, which book should always be a bound record. The amount of cash available for use of operation is shown by the Cash Book.

There is only one Operating and one Administrative Cash Record, except when there is a holding company with subsidiary companies, and the entries are so made that postings can be entered to the Ledger direct from the Cash Book. The entries made upon the credit or disbursement side of the Cash Record are to record the distributions of cash and postings are made from these credit entries to the debit side of Disbursement Accounts to satisfy the disbursement liabilities that have been created. The entries made upon the debit or receipt side of the Cash Record are to record the receipts of cash, and postings are made from these debit entries to the credit side of Accrued Receipt Accounts to close out revenue liabilities that have been created, or the postings from these debit entries are made direct to Receipt Accounts, if the receipts are kept upon a cash basis.

If there were kept only one record for all cash transactions, whether for operation or administration, the Cash Receipts would appear in the Cash Book, or Cash Journal, as coming from the sources as shown in Chart X, and the Cash Disbursements would be made to close Disbursement Accounts, as shown by Chart X.

However, as the record of Operating Cash is kept separate from the Treasurer's record of cash, and as we are dealing with Operating Accounting, we will confine our present illustrations to cash used in production operations, and as recorded in the Operating Cash Book (Form 37).

The form of the Operating Cash Record will vary to suit the needs of each business, but should be a bound record of double pages, the left-hand page for Receipts and the right-hand page for Disbursements of Cash.

CASH RECEIPTS

The cash receipts involved in production operating accounting depends upon the character of the mine, the manner in which the product

Month of January 1918

				Sales	Accounts Receivable	Sundries
Jan	12		Due for Gold & Silver	6719.69		
		√	Refunds - Miscellaneous			20.00
			(One month's Rental on Air Drill)			
		√	Bill # 340 - Wm Hughes		4.80	
		√	Bill # 389 Lamps		20.90	
		√	Bills # 305 - 10 - 14 - 16 - 19 - 22			
		√	326 Denn Ariz Copper Co.		945.20	
		√	Bills # 304 - 27 - 36 E.P. & S.W. System		11.15	
		√	Refunds - Freight			.23
		√	Refunds - Freight			.46
		√	Bill # 1 - E.P. & S.W. System		1.38	
		√	Refunds - Wood Sold			2.40
		√	Bill # 389 Lamps		38.65	
		√	Lead Lat. # 6174	54.274		
		√	Refunds - Old Material Sales			45.004
		√	Refunds - Miscellaneous			40.00
			(Rental on Air Drill)			
			Lead Lat. # 5812	25.742		
		√	Bills # 2 - 5 - 11 E.P. & S.W. System		7.64	
		√	Refunds Freight			1.77
		√	Bill # 353 A.L. Engels		1.91	
		√	Bill # 9 - M. Doak		3.60	
		√	Bill # 46 E.P. & S.W. System		6.00	
		√	Bill # 335 T.O. McGrath		27.44	
		√	Bill # 308 H.W. Lumber Co.,		1.80	
		√	Bill # 339 P.D. Mere Co.,		20.00	
		√	Refunds - Cash Discounts			203.94
			Totals	9809.85	1090.47	718.84
		1	Cash		11613.16	
			To			
		183	Due for Gold & Silver			6719.67
		233	Special Ore Sales			3090.16
		98	Accounts Receivable			1090.47
		241	Refunds & Discounts			718.84
			Balance 1/1/18			22217.43
						23379.39

FORM 37.—Operating Cash Book Receipts.

Month of January 1918

				ACCOUNTS PAYABLE			
				December LABOR	December BILLS AUDITED	January LABOR	January BILLS AUDITED
Jan	31		Checks # 77891 - 79229	32545 74		34726 88	
			,, A2378 - A2477		56233 99		14353 71
		√	Labor - December	32545 74			
		√	,, January	34726 88			
		√	Bills Aud - December	56233 99			
		√	,, ,, - January	14353 71			
		102	Accounts Payable			137860 72	
			To				
		1	Cash				137860 72
			Balance 1/31/18				95933 27
							233799 59

FORM 37.—Operating Cash Book Disbursements.

is sold, and the point of division between operating and administrative accounting. Theoretically, the cash received from sale of production should appear upon the operating books. However, due to the fact that the operating books are kept at the mine, which is usually situated at an isolated and distant point from the office of the Sales Agent and the Treasurer, the receipts from the sale of the principal product are generally remitted direct to the Treasurer and are recorded upon the Treasurer's books. Therefore, the operating cash receipts are usually limited to the following:

Receipts from Treasurer,
Receipts from Sales of Secondary Production,
Receipts from Sales of By-products,
Receipts from Sales of Operating Supplies, Etc.

In some cases even the cash receipts for sales of secondary production and of by-products are recorded upon the administrative books.

The accounting of cash receipts from sale of stock and from issue of notes is done by the Administrative Accounting Department and the record of such transactions never appears on the operating books.

RECEIPTS FROM TREASURER

Remittances of cash either in the form of check, draft, or money, are made to the Operating Department each month by the Treasurer and are of sufficient amount to take care of operating disbursements, or the amount of operating disbursements less the operating receipts of cash from sundry sources made direct to the Operating Department.

The amount of these remittances are entered to the debit of Cash in the Cash Book (Form 37) and the Treasurer's Account is credited a like amount from the Cash Book entry.

CASH RECEIVED FROM SALE OF PRINCIPAL PRODUCTS

When the cash remittances for sales of principal product are made to the Operating Department, the amount of such remittances would, of course, appear upon the Operating Cash Book. However, such remittances are generally made direct to the Treasurer.

As settlements are made by the Sales Department with Customers, Reports of Settlements (Form 38) are made in duplicate, the original is sent to the Treasurer together with cheque for the net amount of the sale, if final, or the total amount of settlement, if a partial settlement, and the duplicate is delivered to the Accounting Department from which a Sale Settlement Check (Form 39) is made, and the details of each sale settlement are entered on Sale Settlement Sheets (Form 40) and postings therefrom are made to the Sales Deliveries and Receipts Sheets in order

that there may be known the amount of settlements made for each month's deliveries and what amount of delivered copper is outstanding. At the end of the month the total amount of remittances, both partial payments

COPY

January 13, 1917.

SHATTUCK ARIZONA COPPER COMPANY

IN ACCOUNT WITH ADOLPH LEWISOHN & SONS

SALES #721	NOVEMBER, 1916	JULY 21, 1916	
By 115,311 Lbs. @ 23¢ per Lb.			$26,521.53
CHARGES			
To			
Freight 115,311 Lbs. @ 24.8¢ per 100 Lbs.		$ 285.97	
½ Per cent Discount $25,681.11		128.40	
Commission		115.31	
Paid December 2, 1916		16,800.00	
Paid December 16, 1916		8,200.00	$25,529.68
BALANCE DUE YOU			$ 991.85

E. & O. E.

FORM 38.

COPPER SALE SETTLEMENT CHECK

SHATTUCK ARIZONA COPPER CO.

Terms

Delivery Month ____ Place ____

Settlement Date ____ Exchange Rate ____

Sale No. ____ Lbs. @ ____ per cent. $ ____

Over	Short			
		Lbs.		$
	Dely.	Lbs.		$
	Excn.			
				$
	SETTLEMENT TOTAL	@		$
Deductions:				
	Insurance	$		$
	Freight	$		$
	Discounts	$		$
	Cathode Als.	$		$
	NET AMOUNT NEW YORK			$
	Commissions	$		$
	Telegrams, etc.	$		$
	NET CASH SETTLEMENT			$

FORM 39.

and settlements in full to Treasurer by the Sales Agent is determined, and the Treasurer is charged and Sales Agent credited, as follows:

Treasurer, Current Year	$106,719.47	
To Sales Agent		$106,719.47

"Amount of remittances to Treasurer during January as shown by Statements of Settlements with Sales Agent."

RECORD OF COPPER SALES SETTLEMENTS

Month of _____ 191__

Date	Sale No.	DELIVERY: Month	DELIVERY: Pounds: Over	DELIVERY: Pounds: Short	DELIVERY: Pounds: Domestic	DELIVERY: Pounds: Foreign	SALE: Cents Per Pounds	SALE: Total	DEDUCTIONS: Freight	DEDUCTIONS: Insurance	DEDUCTIONS: Discounts	DEDUCTIONS: Cathodes	DEDUCTIONS: Excess Frt. & Ins.	RECEIPTS: Total Receipts	RECEIPTS: Commission	RECEIPTS: Telegrams	RECEIPTS: Net Total	REMARKS

FORM 40.

The account with the Sales Agent never shows a balance except when there has been remittances of partial payments, and in such cases the balance in the Sales Agent Account is deducted from the balance in the account Due for Metal Shipped.

At the end of each month the Record of Sales Settlement is closed and journal entry is made from the summary thereof, as follows:

Sales Agents		$106,255.98	
Commissions and Telegrams	$ 572.42		
Freight	473.81		
Excess Freight	693.84		
Discounts	396.44		
Net Settlements	104,119.47		
To Due for Metal Shipped			$106,255.98

"Amount of final settlements of Copper Shipped, as shown by Record of Sales Settlements."

As the Sales Agent remits the net amount of each sale after deductions of commission, freight, etc. subsidiary accounts to the Sales Agent Account are kept to show these deductions.

Also, as the Sales Agent's account is credited with the amount of net remittances only at the time the Treasurer is charged with net cash remittances received, it is necessary to charge out the selling expense paid by the Sales Agent and credit the Sales Agent a like amount, as follows:

Selling Expense Not Due		$2,136.51	
To Sales Agent			$2,136.51
Commissions and Telegrams	$572.42		
Freight	473.81		
Excess Freight	693.84		
Discounts, Etc	396.44		

"Selling expense paid by Sales Agent, as shown by Record of Sales Settlements for January."

CASH RECEIVED FROM SALES OF OTHER PRODUCTS

It is customary for the receipts from sales of secondary products and by-products to be remitted direct to the Operating Department for the reason that the sales of these products are usually made direct to the smelters or refineries and the accounting of them can be handled better by the Operating Department than by the Administrative Department. However, in some cases the remittance for the sale of these products is made direct to the Treasurer the same as in the case of the remittances for sale of the principal product. In the latter case the Operating Accounting for these products is handled in the same manner as done for the principal product.

Record of Gold & Silver Production & Deliveries

Production									Sales Deliveries						
Date		Wr. No.	Metal	Ounces Gold	Ounces Silver	Price	Amount	Total	Date Due		Price	Net Amount	Silver Correction	Bill No	
Feb.	7	56	Au	5.44		20.00	108.80		June	6	20.00				
		54	Ag		338.00	1.25	442.50	581.30		6	.9425	427.37	103.93	32	
	14	58	Au	1.82		20.00	36.40			13	20.00				
		56	Ag		130.00	1.25	162.50	198.90		13	.8500	146.90	52.00	33	
	21	60	Au	3.54		20.00	70.80			20	20.00				
		58	Ag		259.00	1.25	323.75	394.55		20	.9950	394.55	66.04	34	
	29	62	Au	5.84		20.00	116.80			28	20.00				
		60	Ag		339.00	1.25	486.25	603.05		28	.9950	603.05	99.19	35	

FORM 41.

CASH RECEIVED FROM SALE OF BY-PRODUCTS

As cash is received from the sale of by-products it is checked against the Record of Gold and Silver Deliveries (Form 41) and the amount of cash received for the sale of each lot of by-products is entered upon the debit side of the Cash Book, as shown in Form 37, each entry in the Cash Book corresponding with like entry on Form 41.

At the same time a correcting journal entry is made to adjust the inventory price to the actual price received, as shown on Form 41.

No postings are made from the individual entries in the Cash Book except as shown on Form 37.

CASH RECEIVED FROM SALE OF SECONDARY PRODUCTS

As cash is received from sale of secondary products, it is usually accompanied by a Settlement Sheet for each lot of ore, as shown by Form 28, and the net amount of sale of each lot of ore is entered in the Cash Book, as shown on Form 37, each cash book entry corresponding to an entry of a like amount on Summary Sheet 29.

No postings are made from the individual entries in the cash book except as shown on Form 37.

CASH RECEIVED FROM ACCOUNTS RECEIVABLE, ETC.

As cash in payment of accounts receivable and sundries is received, entries are made upon the debit side ofthe Cash Book for each item showing bill number and necessary explanation to insure identification. The amount of each item is posted direct to the proper subsidiary ledger account, the folio of the ledger page being placed in the folio column.

POSTINGS OF CASH BOOK DEBITS

At the end of the month the Cash Book is ruled and a summary made of the debit postings necessary to be made to General Ledger, as shown by Form 37, as follows:

Folio	Account	Amount	
		Debit	Credit
16	Cash	$11,619.16	
183	To Due for Gold and Silve		$6,719.69
233	Special Ore Sales		3,090.16
98	Accounts Receivable		1,090.47
241	Refunds and Discounts		718.84

The posting to the credit of "Due for Gold and Silver" will close out that amount of the debit against accrued receipts that has been liquidated.

The posting to the credit of "Special Ore Sales" will be made only when such sales are treated as a cash receipt, at which time a journal entry must be made to close out the account "Special Ores at Inventory."

If the special ores have been carried from Production into the Accrued Receipts by a charge to "Due for Special Ore Shipments" and a credit to "Special Ore Sales," then the cash book entry would be a credit to "Due for Special Ore Shipments" instead of as shown above.

The credit posting to the Accounts Receivable Account in the General Ledger will reduce the account and amount equal to the individual postings to the subsidiary ledger accounts.

The credit posting to Refunds and Discounts in the General Ledger is usually considered as cash receipts and the amount of this credit is equal to the total of the individual postings to subsidiary ledger accounts of Refunds and Discounts.

The debit posting to Cash in the General Ledger charges the Cash Account with the amount of cash received during the month.

CASH DISBURSEMENTS

Operating Cash Disbursements are made to satisfy the accounts payable liabilities created by the employment of labor as shown by the pay-rolls and the Labor Account in the General Ledger, and to pay for expense contracted either current or accrued, and materials purchased as shown by the audited vouchers entered upon the Bills Audited Record, and by the Bills Audited Account in the General Ledger. All such liabilities are known as Accounts Payable, and disbursements therefore are made by cheque, except petty disbursements handled through the petty cash account which are made in cash.

CASH DISBURSEMENTS FOR LABOR

Cash disbursements for labor are made by cheque for weekly, fortnightly or monthly wages or salaries of regular employees, or for wages or salaries of discharged employees upon presentation of properly signed time statements. All pay-roll cheques are drawn by the paymaster or cashier against time statements bearing pay-roll numbers, which time statements are then given to the persons having immediate supervision of work of employees and by them distributed to the employees for examination, signature and delivery to paymaster or cashier in lieu of receiving pay cheques for like amount.

Discharged employees present identification slips, to paymaster and sign time statement at time of delivery of pay cheque.

Cheques issued for labor are listed in the Pay-roll Cheque Register Form 42, and the total amount of cheques issued each month is entered upon the credit side of the Cash Book, as shown on Form 37.

CASH DISBURSEMENTS FOR BILLS AUDITED

Cash disbursements for bills audited are made by cheque for all Bills Audited as shown by approved vouchers which latter are receipted at the time of payment and returned to the accounting Department.

SHATTUCK ARIZONA COPPER CO
PAY ROLL
CHECK REGISTER

DATE	PAYABLE TO	NUMBER	AMOUNT	CASH BOOK FOLIO	MONTH
	Balance or footings brought forward				
		00			
		01			
		02			
		03			
		04			
		42			
		43			
		44			
		45			
		46			
		47			
		48			
		49			
	Balance or footings carried forward				

FORM 42.

DENN ARIZONA COPPER CO.
BILLS AUDITED
CHECK REGISTER

DATE	PAYABLE TO	NUMBER	AMOUNT	Cash Book Folio	MONTH	AMOUNT
	Balance of footings brought forward	00				
		01				
		02				
		03				
		04				
		05				
		46				
		47				
		48				
	Balance of footings carried forward	49				

FORM 43.

Cheques issued for Bills Audited are listed in the Bills Audited Cheque Register Form 43, and the total amount of cheques issued each month is entered upon the credit side of the cash Book, as shown on Form 37.

REMITTANCES TO TREASURER

When the cash received from the sale of principal product is remitted direct to Treasurer, it is very seldom, if ever, that the Operating Depart-

ment makes a remittance to the Treasurer. However, when all cash receipts from sale of production are delivered to the operating Department, monthly or occasional remittances are made to Treasurer of the surplus cash not required for operation. Such remittances are made by cheque, draft or deposit to the credit of the Treasurer accompanied by remittance vouchers, which are receipted and returned by the Treasurer.

When the operating accounting provides for remittances to the Treasurer it is best to have a separate column in the Cash Book for such transfers instead of passing same through the Bills Audited Record and the Accounts Payable Account.

POSTING OF CASH BOOK CREDITS

At the end of the month the credit side of the Cash Book is summarized for posting to the General Ledger, as shown by Form 37, as follows:

Folio	Account	Amount	
		Debit	Credit
	Labor, December	$ 32,545.74	
	Labor, January	34,726.88	
	Bills Audited, December	56,233.99	
	Bills Audited, January	14,353.71	
46	Accounts Payable	$137,860.32	
16	To Cash		$137,860.32

The postings to the debit of labor and Bills Audited in the subsidiary ledger and the total to Accounts Payable in the General Ledger closes out the amount of the Accounts Payable liabilities that have been liquidated during the month.

The credit posting to Cash Account in the General Ledger reduces the cash the amount that has been distributed.

PETTY CASH ACCOUNT

In order to take care of small items of expense that must be met during the month without going through the procedure of drawing a cheque and voucher for each petty item, a petty cash account is created by drawing a voucher and cheque in favor of the company for the amount desired to have on hand, and this cheque is cashed and the money placed in a separate cash drawer, and a charge is made to Petty Cash in the General Ledger. A pad of blank receipts is purchased and as a payment of cash is made a receipt therefore is taken, or a receipted bill is obtained. When the amount of the petty cash has been disbursed, or nearly so, a voucher is drawn for the amont of the receipted bills in the Petty Cash Drawer, and

BANK & CASH RECONCILIATION

JANUARY 31, 1918

BANK ACCOUNT:	
Bank Balance 1–1–18	$147,504.92
Deposits per Bank Book	96,594.26
	$244,099.18
Checks as per Bank List	145,573.28
Cash as in Bank 1–31	$ 98,525.90
Cash in Office	160.00
	$ 98,685 .90
CASH ACCOUNT	
Cash Book Balance 1–1–18	$222,174.43
Receipts as per Cash Book	11,619.16
	$233,793.59
Checks A-2378 to A-2477 and 77891 to 79229	137,860.32
Balance as per Cash Book 1–31	$ 95,933.27
Checks Outstanding	2,752.63
	$ 98,685.90

Number	Amount	Number	Amount	Number	Amount
A-1785	42.65	71001	24.68	78441	15.30
2456	53.10	71580	7.88	78512	30.00
2463	450.00	71620	34.78	78514	30.00
2464	2.00	71640	0.61	78549	0.67
2465	2.00	72523	16.65	78690	2.30
2466	4.00	72543	0.85	78767	3.66
2467	7.00	72817	1.60	78814	33.36
2468	2.58	72943	2.45	78819	69.90
2469	4.65	73043	0.72	78899	67.80
2470	11.19	73350	0.10	79012	42.85
2471	117.29	74873	0.50	79014	26.10
2472	91.27	75251	14.98	79023	65.55
2473	5.00	75483	4.14	79154	10.73
2475	43.98	75825	1.28	79168	20.40
2476	48.33	75869	1.34	79197	31.35
2477	833.72	76455	0.10	79226	14.55
64526	1.90	76463	2.55	79228	65.55
64727	2.75	76489	0.67	79229	51.00
64862	5.85	76458	1.60		2,752.63
65050	26.25	76552	0.30		
65188	1.16	76555	2.61		
66446	16.05	76871	68.55		
67102	0.67	77068	4.45		
67497	1.00	77297	19.34		
67925	2.70	77856	0.29		
69006	3.13	77862	26.66		
69052	0.85	78017	1.00		
69113	2.35	78074	0.09		
69465	1.00	78087	5.10		
69678	26.38	78190	5.10		
70265	6.00	78236	38.45		
70413	0.79	78286	64.55		

FORM 44.

is entered in the Bills Audited Record with the distribution of the expense to the proper accounts, and a cheque in favor of the Company is drawn for the amount of the expense voucher and is cashed, bringing the petty cash back to the original amount.

Reconcilement of Bank and Cash Account.—As a rule the operating cash is kept in one bank, so that there is no need for a bank account in the General Ledger. However, due to the fact that all the cheques issued and charged against the cash account may not have been cashed by the bank, it is necessary at the end of each month to obtain from the bank a statement of account, together with the cancelled cheques that have been paid by it.

This bank statement is checked against the Cash Account to ascertain that all cash received, as per the Cash Book, was deposited and the cancelled cheques are checked against the Cheque Register to determine what cheques, if any, are outstanding and unpaid. A Reconcilement Statement (Form 44) is then drawn up to show either that the bank and Cash Accounts are in agreement, or that there are certain discrepancies. If there are any discrepancies, the reason therefor is ascertained and adjustments made immediately.

The check of the bank and Cash Accounts is very important and should be performed with due diligence immediately following the end of each month so as to detect any error or fraud and make corrections before such matters become complicated.

Unpaid Cheques.—Usually there is an accumulation of uncalled for pay cheques that are of small amounts, due to the fact that employees have failed to call for their time and have left town and cannot be located. Again and employee will carry about on his person a number of cheques and will lose one or more and will fail to make claim and furnish bond for a duplicate. Usually there is no way to locate such persons, or the individual amount is too small to justify advertising.

A record of these cheques is carried in the monthly Reconcilement and when a number have accumulated for a period of time of more than four years, they are charged to Cash and credited to "Refunds and Discounts—Uncalled for Cheques." Should an owner of one of these cheques show up after the cheque had been charged off, a new cheque can be issued.

CHAPTER XIII

OPERATING STATEMENT AND SCHEDULES

Having accounted for the operations of the business through the stages of Disbursements, Production, Sales, Receipts and Cash, we are now in position to take a statement from the ledger that will show the true condition of production operations at the end of the operating period.

To obtain such a statement was the principal object in mind in performing all of the preceding accounting operations which were executed so as to give the information desired in the Operating Statement. We are now concerned with compiling the information that has been recorded in the General Operating Ledger in such manner as to present in proper form the true condition of the business as of a certain date.

TRIAL BALANCE

Before beginning to compile the Operating Statement it is customary to take from the ledger a statement of balances in the order in which they appear in the ledger, and to add up the debits and credits to ascertain if the ledger accounts are in balance.

Such a statement is known as a Trial Balance, when both the ledger debits and the ledger credits are in balance. In a great many cases this Trial Balance is given to the Manager and others in the form in which the accounts stand upon the ledger. In other cases the debits and credits are separated into different groups, but with no logical arrangement of the accounts.

When this is done it is impossible for the Manager, Auditor, Treasurer or other officers to obtain any definite information of the business without re-arranging the accounts upon the Trial Balance Sheet.

The only value of the Trial Balance is to show that the ledger is in balance, and it should never leave the Accounting Office.

OPERATING STATEMENT AND SCHEDULES

Having recorded upon the ledger the complete operating data and having taken a Trial Balance and found the ledger accounts in balance, the Operating Statement, showing the condition of the business, is compiled from the Trial Balance into groups, as follows:

Debit Accounts	*Credit Accounts*
1. (*a*) Expense Accounts.	1. Revenue Accounts.
(*b*) Depreciation and Depletion.	
(*c*) Previous Year's Production.	
2. (*a*) Cash.	2. (*a*) Current Accounts Payable
(*b*) Receivables.	(*b*) Accrued Accounts Payable Reserves.
	3. Deferred Credits.
3. Production Assets.	4. a. Depreciation Reserve.
4. Deferred Assets and Expense.	b. Depletion Reserve.
5. Fixed Assets.	5. Treasurer's Previous Year's Account.
6. Treasurer's Current Year's Account.	

The arranging of the ledger accounts into groups and the listing of the groups in the order as shown above gives an Operating Statement, as follows:

OPERATION STATEMENT OF THE CONDITION OF THE BUSINESS ON JANUARY 31, 1918

	Debits			
Exploration and development		$ 13,182.42		
Operating Expense		124,837.16	$138,019.58	
Depreciation of Equipment		3,568.33		
Depletion of Mines		47,514.43	51,082.76	
Previous Year's Production			648,970.17	$ 838,072.51
Cash			$ 95,933.27	
Due for Copper Shipped	$258,129.53			
Sales Agent	67,155.93	$190,973.60		
Due for Gold and Silver		10,631.70		
Current Accounts Receivable		11,200.38	$212,805.68	$ 308,738.95
Ores on Hand at Cost			5,352.80	
Unsold Bullion at Inventory			45,670.85	
Sold Metal in Transit			664,934.88	$ 715,958.53
Materials and Supplies			$144,307.12	
Unexpired Insurance			1,199.38	
Replacements			1,520.62	
Suspense			220.00	$ 147,247.12
Construction and Equipment				304,855.58
Treasurer's Current Year's Account				106,719.47
				$2,421,592.16

		Credits		
Ore and Bullion Account		$ 51,023.65		
Future Sales	$899,934.88			
Over-Sales	235,000.00	664,934.88		
Copper Sales Deliveries		205,119.68	$921,078.21	
Gold and Silver Sales		$10,631.70		
Special Ore Sales		3,090.16	$ 13,721.86	
Refunds and Discounts			718.84	$ 935,518.91
Current Accounts Payable			$133,915.78	
Bullion, Freight and Refining Not Due		$ 34,330.80		
Selling Expense Not Due		10,436.16		
Reserve for Accidents		44,695.54		
Reserve for Taxes		52,170.57	$141,633.07	$ 275,548.85
Reserve for Depreciation				229,398.20
Reserve for Depletion				47,514.43
Treasurer's Previous Year's Account				933,611.77
				$2,421,592.16

In order that the Operating Statement may be quickly analysed and made as valuable as possible, schedules, detailing the accounts shown on the Operating Statement should be made out similar to Schedules below numbers 1 to 4 inclusive.

SCHEDULE 1

ANALYSIS OF CASH, RECEIVABLES AND PAYABLES, JANUARY, 31, 1918

Account	Receivables and Cash					Total
	Due Within				Indefinite Or Over	
	One Month	Two Months	Three Months	Four Months	Four Months	
Due for Copper Shipped		$43,654.18	$147,319.42			$190,973.60
Due for Gold and Silver	$ 10,631.70					10,631.70
Current Accounts Receivable	11,200.38					11,200.38
	$ 21,832.08	$43,654.18	$147,319.42			$212,805.68
Cash	95,933.27					95,933.27
	$117,765.35	$43,654.18	$147,319.42			$308,738.95
	Payables					
Current Accounts Payable	$133,915.78					$133,915.78
Accrued Accounts Payable:						
Freight and Refining		$10,010.10	$10,000.25	$14,320.45		33,330.80
Selling		2,788.91	3,654.90	3,992.35		10,436.16
Reserve for Accidents	4,000.00				$40,695.54	44,695.54
Reserve for Taxes				42,449.52	9,721.05	52,170.57
	$137,915.78	$12,799.01	$13,655.15	$60,762.32	$50,516.59	$275,548.85

SCHEDULE 2

DETAILS OF ORE BULLION AND SALES ACCOUNTS ON JANUARY 31, 1918

Memorandum of Production and Sales

Unsold Copper January 1st, 1918		00
January Production		849,440
Apply—On January Sales Deliveries	520,390	
March Sales Deliveries, Over-Sales	23,113	
Overs on October, 1917 Deliveries	1,465	544,968
Unsold Copper 1–31–18		304,472

Memorandum of Refinery and Sales Deliveries

January Refinery Deliveries		734,538
Refined Copper on Hand 1–1–18		00
Overs on October, 1917 Deliveries	1,465	
October, 1917 Sales Deliveries	427,234	
November, 1917 Sales Deliveries	305,839	734,538
Refined Copper on Hand 2–1–18		00

Ores on Hand at Cost

287.508 Dry Tons at Mine	@9.2833	$2,669.02
277.777 Dry Tons at Smelter	@9.6616	2,683.78
		$5,352.80

Unsold Bullion at Inventory

1,705,191 lb. Copper in Transit, as follows:

MONTH	REFINERY DELIVERIES
February	254,323
March	228,386
April	662,242
May	560,240
Total	1,705,191

1,400,719[1] lb. Short on November, December and January

304,472 lb. Unsold Copper @ 15 cts $45,670.85

Sold Metal in Transit

POUNDS	DELIVERY MONTH	AVERAGE PRICE	AMOUNT	
56,499	November	28.406 cts.	$ 19,793.40	
93,830	December	28.176 cts.	26,437.33	
1,250,390	January	25.434 cts.	318,029.15	
680,000	February	26.476 cts.	180,037.50	
460,000	March	26.226 cts.	120,637.50	$664,934.88
2,540,719		26.171 cts.		

Production Oversales

POUNDS	DELIVERY MONTH	AVERAGE PRICE	AMOUNT	
500,000	June	23.5 cts.	$117,500.00	
500,000	July	23.5 cts.	117,500.00	
1,000,000		23.5 cts.		$235,000.00

[1] Reason for Refinery Deliveries being over-sold was due to strike in July and August at Mine and Smelter.

SCHEDULE 3

DETAILS ON MATERIAL AND SUPPLY STOCKS MARCH, 1919

STOCK RECORD AS PER LEDGER

Stock No.	On Hand 1-19	Received March	Total	Issued March	On Hand 3-31-19	Received Year— To Date	Issued Year— To Date
1-*a*	$ 25,145.82	$6,156.79	$ 31,302.61	$ 768.06	$ 30,534.55	$21,619.77	$ 3,676.04
2-*a*	948.83	2.76	951.59	7.28	944.31	172.99	598.06
5-*a*	424.44	1.29	425.73	0.00	425.73	290.15	533.59
6-*a*	12,770.40	135.47	12,905.87	56.40	12,849.47	7,236.77	7,251.55
7-*a*	309.25	67.32	376.57	1.73	374.84	184.37	419.14
8-*a*	317.79	3.17	320.96	125.27	195.69	37.18	205.08
9-*a*	50.04	8.81	58.85	3.53	55.32	233.51	188.83
Mill	$ 39,966.57	$6,375.61	$ 46,342.18	$ 962.27	$45,379.91	$29,774.74	$12,872.29
1	$ 11,463.33	$2,509.79	$ 13,973.12	$1,054.86	$ 12,918.26	$ 4,334.19	$ 3,270.64
2	15,209.27	0.00	15,209.27	62.80	15,146.47	1,384.28	2,836.23
3	8,118.85	0.00	8,118.85	1,514.23	6,604.62	599.06	9,755.35
4	6,918.91	0.00	6,918.91	2,819.56	4,099.35	9,252.19	12,084.98
5	34,341.37	219.98	34,561.35	1,297.56	33,263.79	13,755.49	11,745.96
6	20,256.74	127.96	20,384.70	238.61	20,146.09	2,398.03	2,289.62
7	5,802.59	377.55	6,180.14	44.55	6,135.59	2,052.62	587.09
8	720.55	22.50	743.05	82.78	660.27	574.39	434.06
9	2,207.78	53.79	2,261.57	38.72	2,222.85	1,266.70	508.06
Mine	$105,039.39	$3,311.52	$108,350.96	$7,153.67	$101,197.29	$35,616.95	$43,511.99
Grand Total	$145,005.96	$9,687.18	$154,693.14	$8,115.94	$146,577.20	$65,391.69	$56,384.28

PURCHASE DATA

Item	Number		Amount	
	This— Month	Year— To Date	This— Month	Year— To Date
Orders Placed	44	146		
Invoices Received	108	330	$1,094.39	$48,393.42
Items on Invoices Checked	254	898		
Expense Bills Checked	29	168	443.31	11,907.34
Express Bills Checked	11	39	171.48	263.07
Cash Discounts Taken	21	69	35.79	199.99
Credit Memorandums Received	10	23	331.03	946.93
Freight Claims Filed	1	6	1.39	8.12
TOTAL CREDITS			$368.21	$1,155.04

SCHEDULE 4

CASH SETTLEMENTS WITH SALES AGENT JANUARY, 1918

ON DELIVERIES FOR MONTH OF	POUNDS	GROSS RECEIPTS
October	100,378	$ 27,353.01
November	200,035	55,509.72
December	80,320	23,393.25
	380,733	$106,255.98
Less Deductions:		
Freight	473.81	
Excess Freight	693.84	
Discounts, etc.	396.44	$ 1,564.09
Net Settlements f.o.b. New York		$104,691.89
Commissions and Telegrams		572.42
Net Cash Settlements		$104,119.47
January Receipts (Treasurer's Office)	$106,719.47	
Partial Payments on Hand 1–1–1918	64,900.00	
	$171,619.47	
Partial Payments on Hand 1–31–18	$ 67,500.00	$104,119.47

Analysis of January Settlements as Above

For Delivery	Pounds	Gross		Net New York	
		Per Pound	Amount	Per Pound	Amount
Domestic	380,733	0.2790	106,255.98	0.27497	$104,691.89

The Manager, Auditor or Treasurer, as well as the other officers, upon receiving such an operating statement can clearly see the condition of the business and readily obtain from the statement and schedules the information desired.

On the debit side of the statement the Operating Expense and the Previous Year's Production charge is listed first, and against this, on the credit side, is listed the revenue accounts. The Operating Expense and the revenue are the matters of first importance to the Manager and other officers and therefore are listed first.

A Cost Sheet giving an analysis of the Operating Expense and a statement of Production is always furnished the Manager at the same time the Operating Statement is delivered to him, and it is customary for the Manager to call a monthly meeting of all Operating Department Heads and to go over the expense and costs and production results, receive suggestions, issue instructions and adjust complaints.

As soon as the Sales Deliveries for the year are sufficient to offset the charge for the previous year's production that was unliquidated at the beginning of the year, it is best to close out this charge for Previous

Year's Production to the Sales Deliveries, although this is not necessary and the debit account can be carried on the Operating Statement until the end of the year if desired.

The matters of next importance are Cash and Receivables as compared with Current and Accrued Accounts Payable and therefore these are listed second, and a Schedule of Receivables and Payables (Schedule 1) is made up to guide the Manager, Chief Clerk and Treasurer, as to the amount of cash that is necessary to keep in the Operating Account. Some believe that the information as to whether or not there is sufficient cash and receivables to meet the current and accrued accounts payable is of first importance and list the accounts that show this information first. However, the determination of whether or not the revenue is sufficient to take care of the expense of operation, and the analyzing of the revenue accounts from Schedule 2 to ascertain when cash receipts may be expected are matters that must receive attention before any intelligent conclusion can be reached in regard to taking care of the Accounts Payable when the cash and receivables are insufficient to meet the outstanding indebtedness.

The amount of unliquidated production as shown by the Production Asset Accounts is then given attention. In order that these accounts may be carefully studied a schedule showing the details of Ore, Bullion and Sales Accounts is made up, as shown by Schedule 2.

This schedule allows a careful study to be made of the Production Asset Accounts as to deliveries of metal, unsold and future sales of metal, and furnishes the necessary information to the Manager, the Treasurer and the Directors in instructing the Sales Agent in regard to sales, and what will be the cash receipts from production in the future that will be available for operation or dividends, etc.

The deferred Assets and Expense and the Construction and Equipment are carefully gone over by the Manager, in consultation with the Purchasing Agent, the Chief Clerk, and the Operating Superintendent.

The Purchasing Agent furnishes a detailed statement of the materials and supplies, as per Schedule 3, and the questions of whether or not material stocks are too small, too large, or normal are decided, and the purchasing policy fixed for the next thirty days or longer. If there should be a stock of any material which the Operating Department has discontinued to use, the means of its disposal is agreed upon, and all complaints or suggestions in regard to materials are considered. At the same time the amount and cost of monthly Repairs and Replacements and Construction and Equipment are gone into, and all suggestions and proposals for future repairs and replacements and plans for new construction are submitted and disposed of. The Schedule of Expense and Cost, of Repairs, Replacements and Construction and Equipment are included with Monthly Cost Sheet.

The Chief Clerk explains the nature and reason for all suspense items.

The only other debit item on the Operating Statement is the Treasurer's Current Year's Account. The details of the charges to this account each month is shown by Schedule 4, being the Cash Settlements with Sales Agent. The Treasurer's Current Year's Account is closed into the Previous Year's Account when the Operating Books are closed at the end of the year.

At the beginning of operations the Treasurer's Current Year's Account is a credit account until the amount of production sales receipts delivered to Treasurer are in excess of the Treasurer's remittance to Operating Department, when the Treasurer's Current Year's Account becomes a debit balance.

The Treasurer's Previous Year's Account always shows as a credit balance as long as the property is operating at a profit.

On the credit side of the Operating Statement we have yet to consider the Reserve for Depreciation and Reserve for Depletion. The nature of these charges were explained under Disbursements. In the Yearly Statement at the end of the year there is included a Summary Schedule of the Construction and Equipment, the amount of Depreciation charged off and the net amount to be depreciated.

The Depletion Reserve is transferred to the Treasurer's Books at the end of the year, and is kept on the Operating Books to enable the Operating Department to ascertain the actual operating profit.

Due to the fact that the Operating Books are closed only once each year, we will assume a Yearly Statement to be, as on following page.

The Operating Balance Sheet or Operating Statement, should always show the complete accounts for Operating Disbursements, Production, Sales and Receipts, so that the Operating Manager may have a complete and intelligent statement of the results of that portion of the business for which he is responsible.

Sometimes the Sale and Receipt Accounts are kept upon the Treasurer's Book instead of the Operating Books. When this is done the Manager is informed as to Operating Disbursements only and can not obtain from his records a correct statement of operating results.

In order to insure that the Operating Statement is complete, the head of the Operating Accounting Department must be familiar with all the details of operations, as well as with all the details of the business transactions with others that in any way affect the assets or liabilities of operating, and that influence the costs and income.

All agreements made by the Manager or Department Heads involving payments of money, or transfer of assets, should be confirmed in writing and copy placed on file in the Accounting Office.

Operating Statement of the Condition of the Business at the End of the Year 1918

Exploration and Development	$ 170,497.08		
Operating Expense, Copper	1,345,692.80	$1,516,189.88	
Depletion of Mine's Copper Ores	$ 498,614.51		
Depreciation of Mine Equipment	18,000.00	516,614.51	
Previous Year's Production		648,970.17	$2,681,774.56
Operating Expense, Mill Lead	$ 245,293.66		
Operating Expense, Direct Lead	5,588.84	$ 250,882.50	
Depletion of Mine's Lead Ores	$ 6,102.46		
Depreciation of Mill Equipment	18,474.50	24,576.96	275,459.46
Cash		$ 52,388.78	
Due for Copper Shipped	$212,576.00		
Sales Agent	344.07	$ 212,920.07	
Due for Gold and Silver		23,467.54	
Current Accounts Receivable		5,736.57	242,124.18	294,507.96
Copper Ores on Hand at Cost	$ 4,466.46		
Unsold Copper at 17.643 cts	489,373.42		
Sold Copper In Transit	0.00	$ 493,839.88	
Lead Ore Production	$ 4,536.91		
Lead Ore In Process	863.73		
Lead Concentrates	53,874.04	59,274.68	553,114.56
Materials and Supplies		$ 139,280.73	
Unexpired Insurance		0.00	
Replacements		172.08	
Suspense		8,735.91	148,288.72
Construction and Equipment			547,290.15
Treasurer's Current Year's Account			730,686.58
			$5,231,121.99
Ore and Bullion Account—Copper	$ 493,839.88		
Future Sales Contracts	0.00		
Copper Sales Deliveries	2,319,137.62	$2,812,977.50	
Gold and Silver Sales, Copper Ore	$ 182,049.69		
Special Ore Sales	0.00	182,049.69	
Refunds and Discounts		4,980.74	$3,000,007.93
Mill Lead Bullion Sales		$ 149,560.92	
Mill Lead Gold and Silver	$81,466.33		
Sorted Mill Lead Ore	6,356.09	$ 87,822.42	
Direct Lead Ore Settlements		26,011.91	103,834.33	263,395.25
Current Accounts Payable		$ 100,124.61	
Bullion Freight and Refining Not Due	$ 45,868.38		
Selling Expense Not Due	15,713.31		
Reserve for Taxes	36,760.58	98,342.27	
Reserve for Accidents		68,618.82	267,085.70
Reserve for Depreciation			262,304.37
Reserve for Depletion			504,716.97
Treasurer's Previous Year's Balance			933,611.77
			$5,231,121.99

CHAPTER XIV

OPERATING PROFIT AND LOSS AND CLOSING ENTRIES

The operating Profit and Loss Account is usually opened and closed only once each year and then at the end of the year when the operating books are closed.

However, each month for the information of the Manager and other officers and the directors, a statement of actual operating profit is made up from the Operating Statement for the year to date, also an Estimated Statement of Monthly Operating Profit is drawn. The Monthly Estimated Profit and Loss Statement uses the production at the average market price of metals for the month of production, or the average price of future sales when metals have been sold ahead, and the present market is unsteady.

The Statement of Actual Profit and Loss is generally for the year to date and uses the amount of sold ore and metal shown upon the books plus the amount of unsold ore and metal at inventory.

When the production is being sold as produced the statement of actual profit is the best guide as to the actual results. When there is being carried a large amount of unsold production at inventory which it is the intention to sell before the end of the year, the actual statement of profit or loss as shown by the Operating Statement is not a safe guide unless an addition or subtraction is made thereto to adjust the unsold production from inventory prices to present actual market prices. A statement of actual profit or loss for the period, as shown by the Monthly Operating Statement, would be, as follows:

STATEMENT OF ACTUAL OPERATING PROFIT OR LOSS AS SHOWN BY THE OPERATING STATEMENT

		Amount	Per Pound
Copper Ore, Bullion and Sales, Net		$ 97,446.40	[1]26.171 cts.
Operating Expense		138,019.88	16.248 cts.
Returns on Copper (Loss)		$ 40,573.48	9.923 cts.
Gold and Silver, Sales, etc	$13,721.86		
Refunds and Discounts	718.84	$ 14,440.70	1.700 cts.
Total Earnings (Loss)		$ 26,032.78	11.623 cts.
Depletion and Depreciation		51,082.76	6.014 cts.
Net Operating Earnings (Loss)		$ 77,115.54	5.609 cts.
At Rate per Share per Year		0.00	

[1] Price per pound of copper figured on Average Future Sales Price, and gives results per pound when production shall have been delivered.

In determining the net amount of Copper Ore, Bullion and Sales on the actual Profit and Loss Statement there is subtracted from the amount of the Ore and Bullion and Sales Accounts, the amount of the Previous Year's Production. The amount of the month's or year's to-date production can be divided into this net amount and an average price per pound obtained. However, such an average per pound would be of little value as the amount of unsold copper on hand from month to month would fluctuate this average regardless of the market price of the metal. Also the amount of unsold production carried over from the previous year would fluctuate the average price of metal so obtained. Therefore, it has been found more satisfactory to use the average sales price of copper sold for future delivery, which as a rule, will give results very close to the actual delivered price.

The reason for the loss shown in the actual figures is that in closing for the previous year the unsold copper was inventoried at the average future sales price, while the amount of the unsold copper carried over from previous years was reduced back to cost upon opening the books at the beginning of the year. This will adjust itself as soon as the unsold copper is sold and delivered. For this reason the sales price per pound of future sales is shown opposite the amount, also an estimated Profit and Loss Statement is made up on this average future sales price.

It is more satisfactory especially for the first several months of the succeeding year to close the books at the end of the year with the same inventory price for unsold copper as used during the year, and have this inventory price equal the cost. However, when the price of metal is advancing the directors sometimes wish to inventory the unsold metal at market in closing for the year. While this helps the current year, it destroys the value of the profit and loss account for the succeeding year until all the previous year's copper is sold, also it is contrary to the Treasury Departments Regulations which require the taking of inventories at cost or market, whichever is lower.

COMPARATIVE STATEMENT OF OPERATING PROFIT AND LOSS

In addition to the actual Profit and Loss Statement, it is customary to show the estimated operating profit in total, also per pound of copper, or other metal, and per ton of ore treated, in comparison with previous month and either the year to date, or the previous year.

The reason for fluctuations in profit when not the result of fluctuation in price of metal can often be found more quickly by consulting the per pound and per ton statement in comparison with the previous month than is shown by the actual statement.

The following is the usual form of Comparative Profit and Loss Statement:

COMPARATIVE STATEMENT OF OPERATING PROFIT

Total

	THIS MONTH	PREVIOUS YEAR
Copper	$222,306.94	$3,331,567.12
Operating Expense	138,019.58	1,866,408.20
Earnings on Copper	$ 84,287.36	$1,465,158.92
Gold and Silver	$ 10,631.70	$ 153,547.65
Special Ore Sales	3,090.16	124,874.54
Refunds and Discounts	718.84	8,324.38
Gross Earnings	$ 98,728.06	$1,751,905.49
Depletion and Depreciation	51,082.76	704,131.31
Net Earnings	$ 47,645.30	$1,047,774.18
At Rate per Share per Year	1.63	2.99
Capital Returned per Share	1.75	2.01
Per Pound of Copper		
Copper	$0.26171	$0.27913
Operating Expense	0.16248	0.15638
Net Earnings on Copper	$0.09923	$0.12275
Gold and Silver	0.01251	0.01287
Special Ore Sales	0.00364	0.01046
Refunds and Discounts	0.00085	0.00070
Gross Earnings	$0.11623	$0.14678
Depletion and Depreciation	0.06014	0.05899
Net Earnings	$0.05609	$0.08779
Per Dry Ton Smelted		
Copper	$25.38	$25.51
Operating Expense	15.76	14.29
Net Earnings	$ 9.62	$11.22
Gold and Silver	1.22	1.18
Special Ore Sales	0.35	0.96
Refunds and Discounts	0.08	0.06
Gross Earnings	$11.27	$13.42
Depletion and Depreciation	5.83	5.39
Net Earnings	5.44	8.03
Pounds Copper Per Dry Ton Smelted	96.98	91.40

NOTE.—Copper for month figured on average future sales. Price on Year, actual figures taken from the Operating Statement.

A comparative statement of profit for "this month," "last month," and "year to date" is also very popular.

The pounds of metal recovered per ton is shown as any fluctuation in recovery per ton will change the cost and profit per pound even when the ton cost is the same from month to month.

It is always best to analyze the Profit and Loss Statement in connection with the detail cost statement showing the amount of expense and cost per pound and per ton for the different departments and sub-departments of operation.

The Profit and Loss Account in the general ledger is closed only at the

end of the year. Before closing the Expense and Revenue Accounts into Profit and Loss, adjusting entries are made for any difference in Materials and Supplies as shown between the inventory and the books, and the different revenue accounts are closed into a general revenue account, and the several operating expense accounts are closed into a general operating expense account.

ADJUSTING INVENTORY TO THE BOOKS

It is customary for mines to keep a perpetual inventory record of material and supply stocks, the storekeeper checking up the card records of each article occasionally so that at the end of the year only minor adjustments are necessary.

INVENTORY SHEET

SHATTUCK ARIZONA COPPER CO.

SUPPLY DEPARTMENT

DATE 19

STOCK NO._____ SHEET NO._____

STOCK			UNIT	ARTICLES	PRICE	TOTAL AMT.
Over	Short	On Hand				

FORM 45.

However, it is always best to take an inventory once each year with the assistance of at least one outside clerk or accountant whose duty it is to write up the inventory sheets. This proves up the accuracy and carefulness of the storekeeper and tends to stimulate interest and greater efficiency. The inventory is written up from the actual count of the stock of each article as shown by Form 45, the actual amount on hand being entered on the sheets and is compared immediately with the stock record and the amount of overs or shorts, also is entered on the inventory sheets. Thus the inventory sheets show the differences between the records and stock, as well as the actual stock, and is a means of checking the work of the storekeeper. As the storekeeper's charges for stock issues must be supported by signed requisitions, there is no way that errors can be covered up except by collusion with those who withdraw supplies.

When the inventory is completed the amount of each stock is checked against the book records and a comparative summary made, as follows:

MATERIALS AND SUPPLIES ACCOUNTS ADJUSTED TO INVENTORY, YEAR 1918

Stock	1918 Ledgers	Inventory	Inventory	
			Short	Over
General	$ 24,959.54	$ 24,445.53	$ 514.01	
Iron and Steel	18,122.02	17,967.80	154.22	
Explosives	15,776.13	15,760.91	15.22	
Fuel	7,402.09	6,932.14	469.95	
Lumber and Timber	32,027.73	31,923.43	104.30	
Machinery	31,685.54	32,901.93		$1,216.39
Pipe and Fittings	5,404.27	5,279.67	124.60	
Oils and Greases	888.93	883.53	5.40	
Tools	1,162.39	1,474.85		312.46
Total	$137,428.64	$137,569.79	$1,387.70	$1,528.85
December Handling	1,905.40	1,905.40		
December Jobs Uncompleted	46.69	46.69		
	$139,380.73	$139,521.88		
Profit on Supplies	141.15		141.15	
	$139,521.88		$1,528.85	

If the net difference is an overage of the inventory over the books an entry is made in the journal for posting to the general ledger, as follows:

Materials and Supplies	$141.15	
To Profit on Supplies		$141.15

"Amount that material stocks are over the book records as shown by inventory sheets."

If the inventory sheets are short of the books a charge is made to Loss on Supplies and a credit made to Materials and Supplies Account.

Also, at the same time a journal entry is made for posting to the stock ledgers of the proper debits and credits to balance the stock accounts as shown by the Summary.

Inventorying Ore, Bullion and Undelivered Sales.—Before determining the Gross Value of Production, the Ore and Bullion Inventories should be adjusted to the average net operating cost less selling, or to the market price, if lower. If certain of the undelivered sales have been sold at less than cost or market price on December 31st of any year, then such sales should be inventoried at the sales price. If it is desired to inventory the undelivered sales at sales price when such price is higher than cost or market, as has been customary with most copper mines, in order to get the actual income, that should be applied, against the current year's cost, adjustment will have to be made in making return for federal taxes, unless the Treasury Department should make new rulings.

MISCELLANEOUS ADJUSTMENTS

All adjustments between monthly estimated charges for taxes, selling, depreciation, etc., and actual charges are made so as to be included in the operating expense for the last month of the year, or are made as early in the year as possible.

SUMMARIZING THE REVENUE ACCOUNTS

It is customary to summarize the revenue accounts into one or more general accounts before closing for the year. This allows the Operating Profit and Loss Account to be put in condensed form and reduces the number of accounts to be transferred to the Treasurer's Books, and furnishes the Treasurer with the minimum of accounts bearing the names as they will appear on the Income Account or General Profit and Loss Account. Also it leaves the revenue accounts upon the operating books in proper form for statistical purposes.

The first entry to summarize the revenue accounts is to close the Previous Year's Production into the Copper Sales Deliveries, which will leave a net Copper Sales Deliveries of $1,670,167.45.

The Revenue Accounts are now in condition to be summarized which is done by journal entries for postings to general ledger, as follows:

Gross Value Copper Production			$2,346,057.02	
To Copper Sales Deliveries				$1,670,167.45
Copper Ores and Bullion				493,839.88
Gold and Silver Sales				182,049.69
"Determining the gross value of copper production for the year."				
Gross Value of Lead Production			$ 263,395.25	
To Mill Lead Bullion Sales				$ 149,560.92
Mill Lead Gold and Silver				81,466.33
Sorted Mill Lead Ore				6,356.09
Direct Lead Ore Sales				26,011.91
"Determining the gross value of lead production for the year."				
Refunds and Discounts			$ 4,980.74	
Freight Refunds	$ 218.53			
Miscellaneous Refunds	159.38			
Old Material Sold	880.31			
Uncalled-for Checks	399.31			
Cash Discounts	3,323.21			
Profit on Materials and Supplies			$ 141.15	
To Miscellaneous Operating Earnings				$ 5,121.89
"Determining the Miscellaneous Earnings for the year."				

In closing the Refunds and Discounts Account it is necessary to close also the subsidiary accounts as shown.

SUMMARIZING THE EXPENSE ACCOUNTS

At the same time the operating revenue accounts are summarized the expense accounts are treated in a similar manner by entries, as follows:

Total Copper Operating Expense	$1,516,189.88	
To Exploration and Development		$ 170,497.08
Operating Expense, Copper		1,345,692.80
"Determining the Gross Copper Operating Expense for the year."		
Total Lead Operating Expense	$ 250,882.50	
To Operating Expense, Mill Lead		$ 245,293.66
Operating Expense, Direct Lead		5,588.84
"Determining the Gross Lead Operating Expense for the year."		

STATEMENT OF ACCOUNTS FOR TREASURER

These summarized entries having been posted to the general ledger, the accounts are in proper form to be transferred to the Treasurer's records, and a statement is taken from the ledger and forwarded to the Treasurer for his use in taking the operating accounts up on his books.

In the Treasurer's ledger there is a credit account "Operating Current Year's Account" which offsets the "Treasurer's Current Year's Account" in the operating ledger. Also in the Treasurer's ledger there is a debit account "Operating Previous Year's Balance" which offsets the "Treasurer's Previous Year's Balance" on the operating books. When the operating accounts are taken up on the Treasurer's books these two accounts balance each other.

Determining the Yearly Profit or Loss.—The operating accounts having been made ready for closing the books for the year, the revenue, expense and depreciation and depletion accounts are closed into the operating profit and loss account by journal entries, as follows:

Gross Value of Copper Production	$2,346,057.02	
To Profit and Loss		$2,346,057.02
Miscellaneous Operating Earnings	5,121.89	
To Profit and Loss		5,121.89
"Closing to Profit and Loss the amount of the yearly revenue 'from copper.'"		
Profit and Loss	$1,516,189.88	
To Total Copper Operating Expense		$1,516,189.88
Profit and Loss	498,614.51	
To Depletion of Copper Ores		498,614.51
Profit and Loss	18,000.00	
To Depreciation of Equipment		18,000.00
"Closing to Profit and Loss the amount of the yearly current and accrued expense for copper."		

While these closing entries could be combined into less entries than shown, it is not advisable so to do, as it would give a lump sum in the Profit and Loss Account which would destroy the value of this account for reference and for statistical purposes.

The effort to save bookkeeping by combining and summarizing should not be carried to the point where the entries in the ledger have no value for reference or check.

ADJUSTMENT OF DEPRECIATION CHARGES

When the depreciation of equipment is closed to profit and loss, subsidiary credit journal entries are made for the proper depreciation credit to each construction and equipment charge account appearing in the cost ledgers.

Theoretically, this credit should be taken when the depreciation reserve is set up each month, but this would mean twelve entries for each year, instead of one when handled as above stated.

When the depreciation of equipment charge is adjusted the last month of each year, a schedule of equipment and depreciation is made similar to the following:

SCHEDULE OF CONSTRUCTION AND EQUIPMENT AND DEPRECIATION
YEAR—1918

	Total	Reserved to Jan. 1, 1918	Depreciation Year 1918	Total Depreciation	Net Equipment
Hoist and Gallows Frame	$137,329.31	$134,800.59	$ 1,528.72	$136,329.31	$ 1,000.00
Pump Columns and Pumps	2,765.58	2,765.58		2,765.58	
Condenser and Cooling Tank	3,281.83	3,281.83		3,281.83	
Water Tanks and Lines	2,913.11	2,182.68	500.00	2,682.68	230.43
Oil System	2,054.92	2,054.92		2,054.92	
Tramway Equipment	14,872.85	14,872.85		14,872.85	
Sawmill Equipment	7,327.12	7,327.12		7,327.12	
Machine Shop Equipment	11,040.52	9,644.54	1,000.00	10,644.54	395.98
Tinner Shop Equipment	50.97		50.97	50.97	
Blacksmith Shop Equipment	2,697.83	2,499.34	198.49	2,697.83	
Electrical Equipment	487.22	476.72	10.50	487.22	
Scaffold Flotation Machine	858.74	858.74		858.74	
Janney Flotation Machine	48.74	48.74		48.74	
Assay Office Equipment	1,178.59	1,178.59		1,178.59	
Assay Ore Dryer	591.45	591.45		591.45	
Mine Buildings	26,416.99	22,770.62	3,000.00	25,770.62	646.37
Office Building	11,116.51	3,334.96	5,000.00	8,334.96	2,781.55
Employment Office	1,945.07		1,000.00	1,000.00	945.07
Mine Office	603.98		200.00	200.00	403.98
Lead Mill	294,901.98		18,474.50	18,474.50	276,427.48
Bins and Trestle	6,883.89	2,912.23	3,000.00	5,912.23	971.66
Furniture and Fixtures	6,961.19	4,804.29	1,346.64	6,150.93	810.26
Motorcycle	187.00	87.50	59.50	147.00	40.00
Horses	389.20	389.20		389.20	
Waste Haulage System	5,126.92	4,538.03	588.84	5,126.92	
Ore Conveyor	5.00	5.00		5.00	
Precipitating Plant	17.17	17.17		17.17	
Underground Phones	703.42	703.42		703.42	
Safety First Apparatus	2,596.51	2,530.93	65.58	2,596.51	
Lubricating Oil Tanks	473.43	473.43		473.43	
Fire System (Engine, etc.)	679.35	679.35		679.35	
Lower Tram Loading Platform	120.95		120.95	120.95	
Drill Steel Car	658.81		329.81	329.81	329.00
Mucking Machine Model	4.00				4.00
Total	$547,290.15	$225,829.87	$36,474.50	$262,304.37	$284,985.78

This schedule proves the amount of Construction and Equipment and the amount of Reserve for Depreciation shown on the Operating Statement.

It is customary with mines to depreciate their Construction and Equipment at a certain fixed rate based either upon the estimated life of the mine or the estimated life of the bulk of the equipment when the life of the mine is greater than the life of the equipment, instead upon the estimated life of each piece of equipment. However, for the purpose of computing comparative costs a record should be kept of the average length of life of each piece of equipment.

Frequently the total value of the equipment is depreciated before the equipment is discarded or the mine depleted. In such cases only the new equipment is depreciated, and the old equipment still in use at the termination of operations is salvaged and the amount received therefrom is treated as income.

CLOSING THE TREASURER'S ACCOUNTS

Having closed the operating books and determined the yearly profit, and sent the Treasurer a statement of the operating accounts, it is necessary to transfer the operating profit and the yearly depletion to the Treasurer and to close the Treasurer's accounts for the year.

As all profits are distributed or reinvested by the Treasurer, it is necessary, at the end of the year, to transfer from the Operating Profit and Loss the yearly profit. This is done by charging the Operating Profit and Loss Account and crediting the Treasurer's Previous Year's Account with the amount of the yearly profit.

The reserve for depletion set up each year also is transferred to the Treasurer who is the one to distribute it as capital dividends or to reinvest it in the purchase of new properties. This transfer is made by charging Reserve for Depletion and crediting Treasurer's Previous Year's Account.

In order to clear the operating books for the next year the amount of the advances received from the Treasurer during the year shown by the Treasurer's Current Year's Account, is closed to the Treasurer's Account.

The operating books having been closed for the year, the Treasurer's Account showing the new balance would appear, as follows:

TREASURER'S ACCOUNT

Balance January 1, 1918		$ 933,611.77
Profit for Year, December 31, 1918		306,310.31
Depletion Reserve, December 31, 1918		504,716.97
Treasurer's Current Year, December 31, 1918	$ 730,686.58	
Balance, December 31, 1918	1,013,952.47	
	$1,744,639.05	$1,744,639.05
Treasurer's Previous Year's Balance, January 1, 1919		$1,013,952.47

YEARLY PROFIT OR LOSS

Like entries must be made to profit and loss for expense and revenue from any other separate source of income and expense the same as made for copper, and when these have been made and posted they early combined Profit and Loss Account would appear, as follows:

COMBINED OPERATING PROFIT AND LOSS

YEAR—1918

Copper Sales Deliveries	$1,670,167.45		
Copper Ore and Bullion	493,839.88		
Gold and Silver Sales from Copper	182,049.69		
Gross Value Copper Production		$2,346,057.02	
Refunds and Discounts	$4,980.74		
Profit on Supplies	141.15		
Miscellaneous Earnings		$5,121.89	
Mill Lead Bullion Sales	$149,560.92		
Mill Lead Gold and Silver	81,466.33		
Sorted Ore Settlements	6,356.09		
Direct Lead Ore Settlements	26,011.91		
Gross Value Lead Production		$ 263,395.25	
Total Operating Income			$2,614,574.16
Total Copper Operating Expense	$1,516,189.88		
Total Lead Operating Expense	250,882.50		
Total Expense		$1,767,072.38	
Depletion of Copper Ores	$498,614.51		
Depletion of Lead Ores	6,102.46		
Total Depletion	$ 504,716.97		
Depreciation of Copper Equipment	$ 18,000.00		
Depreciation of Lead Equipment	18,474.50		
Total Depreciation	$ 36,474.50		
Total Capital Returned		$ 541,191.47	
Total Charges			$2,308,263.85
Operating Profit			$ 306,310.31
At Rate per Share for Year			0.875
Capital Returned per Share for Year			1.44

RULING THE ACCOUNTS

Either as each account is closed or after the books are closed all ledger accounts should be ruled and balances brought down so as to keep each year's record separate.

The proper ruling of the profit and loss and other accounts is important as the ledger and summary accounts can be made clear or confused depending upon the method of ruling.

SECTION 3

ADMINISTRATIVE ACCOUNTING

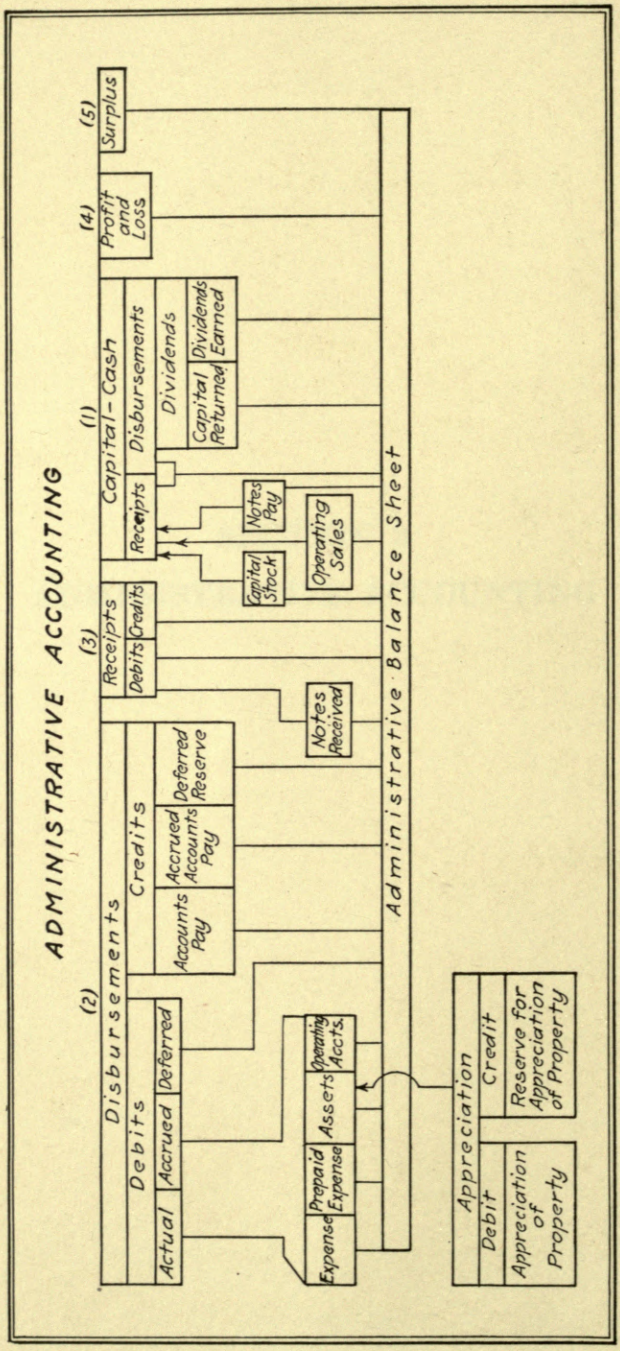

ADMINISTRATIVE ACCOUNTING
(2)
Disbursements
Debits
Actual
Accrued
Deferred
Credits
Accounts Pay
Accrued Accounts Pay
Deferred Reserve
(3)
Receipts
Debits
Credits
(1)
Capital-Cash
Receipts
Disbursements
Dividends
Capital Returned
Dividends Earned
(4)
Profit and Loss
(5)
Surplus
Capital Stock
Notes Pay
Operating Sales
Notes Received
Expense
Prepaid Expense
Assets
Operating Accts.
Administrative Balance Sheet
Appreciation
Debit
Appreciation of Property
Credit
Reserve for Appreciation of Property

CHART 11-B.

CHART XI

ADMINISTRATIVE ACCOUNTS

ACCOUNT NO.	ACCOUNT
	Disbursement Accounts
1	Bills and Salaries Audited.
2	Federal Taxes Accruing.
3	Accrued Interest Unpaid.
4	Investment Obligations Contracted.
5	Depreciation of Equipment.
	(*a*) Operating Equipment.
	(*b*) Administrative Equipment.
6	Depletion of Mine Investment.
7	Depletion of Mine Appreciation.
8	Accounts Payable.
9	Reserve for Federal Taxes.
10	Reserve for Accrued Interest.
11	Reserve for Investment Payments.
12	Reserve for Depreciation of Equipment.
13	Reserve for Depletion of Investment.
14	Reserve for Depletion of Appreciation.
	Expense Accounts
15	Administrative Expense.
	(*a*) Directors' and Officers' Salaries.
	(*b*) General Office Expense.
	(*c*) Legal and Technical Expense.
	(*d*) Traveling.
	(*e*) Advertising and Donations.
	(*f*) Interest and Exchange Paid.
	(*g*) Stock Transfers and Registration.
	(*h*) Insurance.
	(*i*) Miscellaneous.
16	Federal Taxes.
	(*a*) Income Taxes.
	(*b*) Profits Taxes.
	(*c*) Capital Stock Taxes.
	(*d*) Miscellaneous Taxes.
	Prepaid Expense Accounts
17	Unexpired Insurance.
18	Suspense.
	Asset Accounts
19	Mine Property Investment.
	(*a*) Mining Claims.
	(*b*) Mine Development.
	(*c*) General Development.
20	General Office Equipment.
21	Industrial Stocks.
22	Industrial Bonds.
23	United States Bonds.
24	Accounts Receivable.

Operating Accounts

25 Operating Account Current Year.
26 Operating Account Previous Year.

Receipt Accounts

27 Interest Accrued on Bank Deposits.
28 Interest Accrued on Industrial Bonds.
29 Dividends Due on Industrial Stocks.
30 Interest Accrued on Government Bonds.
31 Interest Accrued on Loans.
32 Administrative Receipts.
(*a*) Interest on Bank Deposits.
(*b*) Interest on Investments.
(*c*) Interest on Loans.
(*d*) Refunds and Discounts.
33 Notes Receivable.
34 Receipts from Sales Agent.
35 Operating Sales Settlements.

Cash and General Accounts

36 Capital Stock Authorized.
37 Capital Stock Unissued.
38 Notes Payable.
39 Cash.
40 Dividends from Surplus.
41 Dividends from Depletion.
42 Reserve for Dividends from Surplus.
43 Reserve for Dividends from Depletion.
44 Profit and Loss Account.
45 Earned Surplus.
46 Mine Property Appreciation.
47 Property Appreciation Reserve.

CHAPTER XV

ADMINISTRATIVE ACCOUNTING

The Administrative Accounting is usually done under the direction of the Treasurer, and consists of three divisions: First, that which has to do with the activities of the organization from its inception until the mine property is made a producer; second, from the time that the property becomes a producer until the dissolution of the business; and third, the dissolution of the business.

The first division covers the promotion and development of the property as set forth in Chapters III, IV, and V. The second division has to do with the results of production operations, as will be hereinafter set forth. The third division has to do with the dissolution of the business, the liquidation of the capital assets, the distribution to stockholders of the net amount obtained thereform, and the final closing of the books.

As the Capital Stage of Administrative Accounting has been covered, we will proceed with the accounting of the Results of Production Operations. Administrative Accounting of Mining covers the same ground as Corporate Accounting, which has been well presented in published volumes now on the market. Therefore, only that part of Administrative or Corporate Accounting as applies to mining and the disposal of the results of mining operations will be illustrated.

CHART OF ADMINISTRATIVE PRINCIPLES

A chart of principles of Administrative Accounting, as shown by Chart II-*B*, should first be drawn to serve as a guide and to insure completeness and uniformity in the Administrative Accounting.

Chart II-*B* covering the principles of Administrative Accounting combined with Chart II-*A*, illustrating the principles of Operating Accounting, results in a chart giving all the principles involved in Mining Accounting, as shown by Chart II.

WORKING FACTORS

The principles of Administrative Accounting having been determined, it is next in order to establish a chart of Administrative Accounts in harmony with these principles and that will properly record the transactions of the Administrative Department of the business. Such a chart of accounts is shown by Chart of Administrative Accounts XI.

This chart includes certain asset and receipt accounts that would not be used by small producers that do not invest in the stocks or bonds of other industries, but distribute all the earnings as well as capital returned. The large producers, or those who plan to continue in the business, do not distribute their depletion reserves as capital dividends, but invest them in good bonds and securities until an opportunity arrives to purchase new properties of promise.

Having established the Chart of Accounts there should be drawn a Schedule of Charges and Credits to these accounts to insure uniformity in the compiling of the accounting data. We will not illustrate such a schedule as most of the Administrative Accounts are of such a nature as to indicate the charges and credits to be made thereto.

STATEMENT AT BEGINNING OF THE YEAR

In order that the accounting may be uniform and in conformity with practice we will assume that the condition of the Administrative Accounts at the beginning of the year is as shown by the following statement:

ADMINISTRATIVE BALANCE SHEET AT BEGINNING OF YEAR

Mine Property Investment	$3,022,500.00
General Office Equipment	744.10
Cash	1,258,641.31
Accounts Receivable	196.17
United States Liberty Bonds	400,000.00
United States Liberty Bonds Subscription	100,000.00
Dividends from Depletion	1,137,500.00
Operating Account, Previous Year	933,611.77
	$6,853,193.35
Capital Stock Issued	$3,500,000.00
Reserve for Federal Taxes	147,033.37
Reserve for Bond Subscription	100,000.00
Reserve for Dividends from Surplus	87,500.00
Reserve for Dividends from Depletion	87,500.00
Reserve for Depletion of Mine Investment	697,983.51
Reserve for Depletion of Mine Appreciation	1,230,047.96
Earned Surplus	1,003,128.51
	$6,853,193.35

We are now in position to account for the transactions of the administrative end of the business, consisting of Disbursements, Receipts, Cash, etc., as shown by Chart II-*B*, and Chart of Accounts XI.

In order to simplify the presentation of Administrative Accounting, the total disbursements for the operating year will be treated as a whole instead of on a monthly basis as done in practice.

CHAPTER XVI

ADMINISTRATIVE DISBURSEMENTS

Administrative Disbursements consist of Actual or Current, Accrued and Deferred, as shown by Chart XII.

ACTUAL OR CURRENT DISBURSEMENTS

All of the Actual or Current Disbursements are made by means of voucher blanks, and these vouchers are recorded in the Voucher or Bills Audited Record, Form 6.

We will assume that the total Current Disbursements for the year as shown by the Bills Audited Record is $2,085,019.24. Therefore, the total entries for Current Disbursements upon the Administrative Journal, Form 1 for posting to the Administrative Ledger, Form 2 would be:

Bills and Salaries Audited.....	$2,085,019.24	
To Accounts Payable.....		$2,085,019.24

Accrued Disbursements.—As a rule the only Accrued Disbursements to be accounted for upon the Administrative Books are the Federal Taxes, with occasionally Accrued Interest Unpaid upon outstanding obligations, and Investment Obligations Contracted and Unpaid. Unless the concern is unable to meet its interest obligations, the interest is paid as it becomes due, and only the Federal Taxes and Investment Obligations Unpaid are left as Accrued Disbursements.

Federal Taxes.—Federal Taxes at the present time consist of Income Tax, Profits Tax and Capital Stock Tax. To determine the Income and Profit Taxes, the requirements of Treasury Department Regulations No. 45, must be met. To detail these requirements would require the duplicating of the Treasury Department's Regulations, which is a volume in itself. It is the duty of every accountant as well as the officers of the business to familiarize themselves with the Regulations governing the determination of taxable income and the Capital Stock Tax. To ignore the requirements of the Treasury Department, will result in incurring interest charges upon any additional assessment of taxes as result of understatement of income with fine and possible penalties not only for understatement of income, but for failure to furnish certain information.

The accounts should be kept to conform as nearly as practicable with the requirements of Regulations of the Treasury Departments relating to the federal income and profits tax laws, etc.

ADMINISTRATIVE DISBURSEMENTS

Accounts Debit

Actual	Accrued	Deferred
Bills and Salaries Audited	Federal Taxes Accruing, Accrued Interest Unpaid, Investment Obligations Contracted	Depreciation of Equipment Depletion of Mine Investment Depletion of Mine Appreciation

Distribution of Disbursements

Expense Accts		Asset Accts.	Operating Accts.
Department Expense	Prepaid Expense	Mine Property Investment	Operating Acct. Current Year
Administrative Expense	Unexpired Insurance	General Office Equipment	Operating Acct. Previous Year
Federal Taxes	Suspense	Industrial Stocks	
		Industrial Bonds	
		United States Bonds	
		Accounts Receivable	

Accounts Credit

Current Accts. Pay	Accrued Accts. Pay	Deferred Reserves
Accounts Payable	Reserve for Federal Taxes	Reserve for Depreciation
	Reserve for Accrued Interest	Reserve for Depletion of Investment
	Reserve for Investment Payments	Reserve for Depletion of Appreciation

CHART XII.

The income, in addition to being segregated so as to give all necessary operating information, should be further segregated between taxable and non-taxable income, when the business has income from outside investments.

The disbursements should be segregated into Capital Assets, Expense and Prepaid Expense, as shown, and any yearly operating expense and accrued income not allowed by the Treasury Department's Regulations governing determination of taxable income should be so recorded as to be quickly ascertained and added to the amount of earnings, in determining taxable income at the end of the year.

Special provisions in the Treasury Department's Regulations governing determination of taxable income of mines are: the writing up of the value of the mine property when the value as of March 1, 1913, or the date of discovery of a mine, since March 1, 1913, is in excess of cost of property, in order to determine the capital sum returnable from gross income through depreciation and depletion allowance; and the using of realized appreciation of property value as of March 1, 1913, or as of any subsequent date, as surplus in computing invested capital.

At the end of the year there is determined the amount of net income of the business, before federal taxes is deducted. From this amount there is deducted the amount of non-taxable income, and there is added items of expense not allowed, and upon the amount remaining is figured the Income and Profit Taxes for the year upon the Internal Revenue Form No. 1120.

When the amount of such taxes have been determined, it is taken up by journal entry, as follows:

Federal Taxes Accruing	$38,410.67	
To Reserve for Federal Taxes		$38,410.67
"Amount of income and profits taxes for the year."		

Other Accrued Disbursements.—When interest payments are not met on due date, the amount due should be taken up on the books as an Accrued Disbursement, offset by a reserve credit, or the charge can be made direct to the proper expense account, offset by a reserve credit.

Subscriptions for stocks or bonds to be paid for on installment or by periodic payments should be accounted for in the same manner. If any part of the subscription is not taken up, it can be taken off the books by a reverse entry.

When obligations for purchase of securities are contracted it is best to record the liability upon the books by a journal entry for posting to the ledger, as follows:

United States Liberty Bonds Subscription		$286,428.15
U. S. 4¼ per cent Liberty Bonds	$286,428.15	
To Reserve for Bond Payments		$286,428.15
"Amount of 4¼ per cent U. S. Liberty Bonds contracted for purchase on time payments."		

As such obligations are met by cash payments, the amount of the accrued liability liquidated is transferred to the proper asset account. Sometimes the charge is made to the asset account direct and not passed through the accrued account. However, this is wrong in principle. Again, no entry is made upon the books until the actual transaction in cash is made. When this is done the liability is not shown in the balance sheet.

Deferred Disbursements.—The Deferred Disbursements consist of depreciation of Administrative equipment and the segregating of the Depletion of Mines taken up on the Operating Books and transferred to Administrative Books into Depletion of Mine Investment and Depletion of Mine Appreciation, when the depletion charge is based upon the value as of March 1, 1913, or the discovery value, and this value is in excess of cost.

It is very important that the depletion charge should be so divided; first, in order to show the amount of realized appreciation which can be considered as Surplus and used as Invested Capital in determining the profits tax as provided in Article No. 844 of Requlations No. 45; second, in order that the true cost of production can be obtained. In some cases the amount of property appreciation as of March 1, 1913, or the discovery value, is so much in excess of property investment as to make the depletion cost nearly equal the mine operating cost, and to show the property operating at a loss on normal price of metal.

Appreciation of Property Investment.—When the value of the mine property has been written up above cost for the purpose of establishing a basis for depletion allowance as set forth in Articles Nos. 202 and 203 of Regulations No. 45, the increased value should not be shown as Mine Property Investment. To do so results in misunderstanding or uncertainty in the minds of those examining the balance sheet. Such an entry covers up the amount of the actual investment in property. Neither should the offsetting credit be shown as Surplus, Paid In Surplus, or Property Surplus. To show this credit in such manner leads the stockholders to believe that their company has a larger distributable surplus than is the case, and when included in Surplus makes it impossible to ascertain the true earned surplus from the balance sheet. Such increased value should be taken up on the books by a journal entry, as follows:

Mine Property Appreciation	$5,326,515.62	
To Appreciation Reserve		$5,326,515.62
"Estimated value of mine property as of March 1, 1913, in excess of investment, as shown by statements on file."		

By so taking this increased value up on the ledger and showing it in this manner on the balance sheet, the true condition of the business is shown and confusion and misunderstanding is avoided.

Distribution of Disbursements.—Having recorded the disbursement liabilities for the period upon the books, it is necessary to distribute

the current and accrued liabilities to the proper Expense, Prepaid Expense, Asset or Capital Accounts and Operating Accounts.

The distribution of the current disbursements is kept in the Bills Audited Record and is made to the proper accounts regardless of whether or not the current disbursement liabilities have been met in full by cash payments.

Distribution of Current Disbursements.—The distribution of the current disbursement liabilities as shown by the Bills Audited Record is journalized as shown, as follows:

Operating Account, Current Year		$1,450,000.00
Account, Receivable		17,648.48
D. A. C. Co	$17,648.48	
Reserve for Bond Subscription		386,428.15
General Office Equipment		107.60
Administrative Expense		83,801.64
Directors' and Officer's Salaries	30,000.00	
General Office Expense	7,853.88	
Legal and Technical Expense	5,464.51	
Traveling	1,910.00	
Advertising and Donations	10,965.50	
Interest and Exchange Paid	2,875.10	
Stock Transfers and Registration	1,735.40	
Miscellaneous	947.25	
Operating Salaries	22,050.00	
Reserve for Taxes		$ 147,033.37
To Bills Audited		$2,085,019.24

"Distributing the current or actual disbursements."

This entry closes out the Bills Audited Account on the ledger and leaves the amount of Bills Audited Unpaid to be shown by the Accounts Payable Account.

Distribution of Accrued Disbursements.—The amount of Accrued Disbursement Liabilities that are chargeable to the period's operations, such as Accrued Interest Unpaid and Accrued Taxes must be transferred to the proper expense accounts at the end of each period, regardless of whether or not the obligation has been met by cash payments.

It is better not to transfer the Accrued Taxes, which are usually taken up for each quarter, until finally determined after the actual yearly taxable income has been determined. When the actual amount of the yearly federal taxes have been ascertained, a Journal entry transferring the accrued amount should be made, as follows:

Federal Taxes	$38,410.67	
Income Taxes	$0.00	
Capital Stock Tax	0.00	
To Federal Taxes Accrued		$38,410.67

"Closing out the accrued federal taxes to expense for the year."

However, in the case of obligations created by subscriptions for stocks or bonds or other investments, transfers from the accrued accounts to asset accounts are made only when the actual transfer of the investment securities is made, as shown by the following entry:

U. S. 4¼ per cent Liberty Bonds.....	$386,428.15	
To U. S. 4¼ per cent Liberty Bonds Subscription....		$386,428.15

"Amount of subscription for 4¼ per cent Liberty Bonds taken up by payments."

If a subscription or contract for investment securities is allowed to become void, the amount of the obligation is written off the books.

In practice the writing up on the books of obligations entered into for purchase of securities or property is not always done. However, the true condition of the business can not be shown and the proper perspective can not be obtained from the Balance Sheet if such obligations are not recorded upon the books and shown on the Balance Sheet.

DISTRIBUTION OF DEFERRED DISBURSEMENTS

The Depreciation of Equipment and Depletion of Mine Investment and Mine Appreciation is not distributed but is charged to the Income Account or General Profit and Loss Account, in order to create reserves out of gross income to cover the Reserve for Depreciation of Equipment and Reserve for Depletion of Mine Investment and Appreciation.

The Reserve for Depreciation of Mine Equipment is carried on the Operating Books to take care of purchase of new equipment when the original equipment has become obsolete or is worn out, as explained under Operating Disbursements.

When the mine has been abandoned and it is desired to liquidate the assets, the Depreciation Reserve is transferred to the Administrative Books and is distributed as Capital Dividends, as provided in Article No. 1549 of Treasury Department Regulations No. 45.

The Reserve for Depreciation of Administrative Equipment is likewise used either for purchase of new equipment or for distribution as Capital Dividends.

The Reserve for Depletion of Mines is divided into Reserve for Depletion of Investment in Mine Property, and Reserve for Depletion of Appreciation of Mine Property above cost, as of March 1, 1913, or as of 30 days after date of discovery. The reason for dividing the Depletion Reserve is to obtain the realized appreciation which may be used as invested capital as here-in-before explained.

The Reserve for Depletion of Mines is taken up on the Operating Books each month and is transferred to the Administrative Books at the end of the year.

If new mine properties are purchased, the amount of the Depletion

Reserves and the amount of original property investments should be reduced an amount equal to the new investments or until the Depletion Reserves have been exhausted. Any investments in new mine property in excess of Depletion Reserves will be considered as made out of surplus, unless provided for by new capital.

The reduction in Depletion Reserve to offset purchases of new properties is made by journal entry charging Reserve for Depletion and crediting Original Property Account.

Sometimes it is decided to distribute the Depletion Reserves, especially when such have become larger than what it is considered necessary for reinvestment in new property to continue the life of the business. Again, it is decided to gradually liquidate the business by distribution of the Depletion Reserves as Capital Dividends. When such distributions are made, either from Reserve for Depletion or Depreciations, care should be taken to meet the requirements of Article No. 1549, and to credit the Property Account and debit the Reserve for Depletion Account and amount equal to the Capital Dividends disbursed.

OPERATING ACCOUNTS

The amounts of remittances made to the Operating Department are charged to the Operating Account, Current Year, and the balance of this account, after being credited with the Operating Sales Settlements, at the end of the year, is closed into the Operating Account, Previous Year. The balance in this latter account must offset the balance in the Treasurer's Account, Previous Year, appearing on the Operating Ledger.

DISTRIBUTION OF PREPAID DISBURSEMENTS

The Prepaid Administrative Expense usually consists of Prepaid Insurance and Suspense items of Advances for Traveling, to Agents, etc.

Each month the proportional amount of insurance is charged to Administrative Expense, Insurance, and Unexpired Insurance credited. Also, all Suspense items that have been adjusted are charged to Administrative Expense, and Suspense credited.

CHAPTER XVII

ADMINISTRATIVE RECEIPTS AND CASH

ADMINISTRATIVE RECEIPTS

The Administrative Receipts consist principally of interest on bank deposits, investments and loans. These receipts may be taken upon the books as they become due, or as they are received.

Receipts on an Accrued Basis.—For instance when the books are kept on an accrued basis in the case of interest on bank deposits, the account Interest Accrued on Bank Deposits is debited and Administrative Receipts, Interest on Bank Deposits, is credited for the amount of interest due. The debit account is closed out by posting from the Cash Book after the amount of interest has been received and entered upon the Cash Book.

The same method of procedure is followed in the case of interest on industrial and government bonds, and dividends on stocks, and interest on loans.

Receipts on a Cash Basis.—In practice only interest on loans is taken up on the books as it becomes due, as such interest payments are not always paid on due date. All other receipts such as interest on bonds, bank deposits, etc., are usually treated as Cash Receipts, and the Receipt Accounts are opened by postings from the Cash Book.

Refunds and Discounts are as a rule handled on a cash basis and not put on the books until received and entered on the Cash Book, when postings are made to the Refund and Discount Account in the ledger. The Accrued Operating Receipts have been taken up on the Operating Books and therefore all cash received by the Treasurer in payment of Operating Receipts are treated as Cash Receipts.

Administrative Cash.—Cash is the keystone to any business. In the business of mining the amount of original cash raised as Capital should be sufficient to purchase the property, develop and equip it ready for production and to carry production until cash payments are received from sales to customers.

When the business is operating at a profit the amount of cash gradually increases beyond the original amount necessary, and this surplus is used to enlarge the business, to purchase and develop other properties, to purchase the stock of proven properties, or is distributed as dividends.

The amount of cash available for use in the business is shown by the Administrative Cash Book (Form No. 5), in which all cash transactions

are recorded. If money is kept in more than one bank a separate bank account must be carried in the ledger for each bank.

CASH RECEIPTS

The Administrative Cash originates from three sources:

First.—Cash put up as capital by the owners of the business for stock or shares.

Second.—Cash borrowed upon notes, etc.

Third.—Cash received from the sale of production.

Of course, there are receipts of cash such as cash discounts, refunds, and cash received in payment of accounts receivable created by sales of operating supplies and labor or services of employes to others. However, such cash received is nothing more than a repayment of cash advances and do not, as a rule, affect the amount of cash used in the business.

Cash Received from Sale of Stock or Shares.—The cash put up by the owners of the business is used for purchase of mine property, its equipment and development, and to carry the expense of operation until the receipt of cash from sales of production.

The accounting of the cash put into the business as Capital from sale of stock or shares has been illustrated in Chapters II and III, and the amount of this cash stands upon the books as Capital until the business is liquidated, when this capital, or whatever may be left of it, is returned to the owners.

Cash Received from Notes Issued.—Occasionally it is necessary for the business to carry its product for a greater period of time than usual, or for some reason it is found necessary to have more cash to take care of the business. To meet such needs money is borrowed. In such cases it is customary for the Treasurer to raise funds upon notes which, if in excess of the amount of credit which the business is able to obtain, are secured by refinery warrants for unsold metal, by assignment of accounts of customers, or by mortgage upon the assets of the business.

When cash is so obtained, an entry is made on the debit side of the Cash Book, showing by whom the note was accepted, due date, rate of interest, etc., and posting made to liability account, Notes Payable, in the ledger. The full amount of the note should be recorded. If the note is discounted the amount of the discount should be entered on the credit side of the Cash Book and posted to the ledger account, Administrative Expense, Interest and Exchange Paid.

Should it be the practice of the business to issue notes, a Notes Payable Record should be kept. The form of such a record is practically the same for all lines of business.

Cash Received from Sales of Product.—It is the usual practice for all money received in payment of sales of the principal product by the Sales Department to be delivered to the Treasurer who records the

amount received from each sale, whether a partial or a complete settlement, in the Administrative Cash Book for posting to the credit ledger account, Receipts from Sales Agent.

At the end of each month, or at the end of the year the amount of completed sale settlements is determined and balanced with the Operating Sale Settlement Sheets and such amount is credited to Operating Sales Settlements by a journal entry, as follows:

Receipts from Sales Agent	$2,180,686.78	
To Operating Sales Settlements		$2,180,686.78
"Crediting the Operating Department with the amount of completed sales settlements of sold product."		

If any balance is left in the account, Receipts from Sales Agent, it should be equal to the partial payments made on account, as shown by Sales Agents reports of partial payments received and transmitted to the Treasurer.

To offset the credit given the Operating Department upon the Administrative Books for Operating Sales Settlements, a charge is made to Treasurer, Current Year, upon the Operating Books, as shown in Operating Cash, under **"Receipts From Sale of Principal Products."**

If the remittances in payment of sales of secondary and by-products are made to the Treasurer, instead of to the Operating Department, they are handled in the same manner, except that subsidiary accounts for Sale Settlements of Principal Products, of Secondary Products, and of By-products should be carried to support the Operating Sales Settlements Account.

POSTINGS OF CASH BOOK DEBITS

At the end of each month the Cash Book should be totalled, balanced and closed. When the volume of business is large it is best to have a ruled column in the Cash Book for each class of active receipts, and one for sundries. This allows a debit summary to be made quickly, as follows:

Account	Folio	Amount	
		Debit	Credit
Cash	12	$2,234,509.62	
Receipts from Sales Agent	98		$2,180,686.78
Interest on Bank Deposits	102		23,051.55
Interest on Investments	104		30,457.12
Accounts Receivable	106		0.00
Reserve for Dividends Unclaimed	108		118.00
			$2,234,313.25
Cash on Hand January 1, 1917			1,258,641.31
			$3,492,954 56

Only the totals as shown should be posted to the General Ledger accounts, which saves posting and prolongs the life of the General Ledger. The individual entries in the Cash Book of "Receipts from Sales Agent" will be supported by the Record of Sales Settlements and need not be posted unless it is desired to carry subsidiary ledger accounts for each sale. The individual entries of Interest on Bank Deposits, and Interest on Investments will be supported by the Record of Interest Received, although separate subsidiary ledger accounts may be carried for each source of interest and individual postings made thereto if desired.

The individual items of accounts receivable are posted direct to the individual accounts in the subsidiary ledger, and the total to the General Ledger Account.

The General Ledger should be bound, while the subsidiary ledger may be loose leaf.

CASH DISBURSEMENTS

Administrative Cash Disbursements are made to liquidate the accounts payable liabilities, as shown by the Bills Audited Record and the dividend liabilities created by dividends declared. All cash disbursements are made by cheque, unless a petty cash account is carried for small disbursements to be made in cash.

Cash Disbursements for Bills Audited.—It is the usual practice to make all Administrative Disbursements except for dividends by vouchers and to record all disbursements in the Bills Audited, or Voucher Record (Form No. 6). At the end of each month, or as occasion requires, cheques are drawn in payments of each voucher and the number of each cheque is listed in the Voucher Record, which also serves as a Cheque Register.

To avoid duplication, only the total amount of cheques issued against vouchers audited is entered on the credit side of the Cash Book with proper explanation at the end of each month. It is best to have on the credit side of the Cash Book a ruled column each for "Bills Audited," "Dividends," and "Sundries." This enables a summary to be obtained quickly and makes a record that is easily analyzed. If desired a separate column can be provided for advances to operations, especially when operations are carried on at more than one place.

Cash Disbursements for Dividends.—Dividends that have been declared are specified either as Earned Dividends or Capital Dividends and an entry is made on the books as of date of declaration creating a Reserve for Dividend from Surplus No. 127, or Reserve for Dividend from Depletion No. 128. In order to provide the funds with which to pay to each individual stockholder the amount of dividend due on the stock in his name, a cheque in favor of the bank on which the dividend cheques have been drawn is made and deposited to the credit of Dividend No. , on

the date the dividend is due and payable. The amount of this cheque is entered on the credit side of the Administrative Cash Book with proper explanation and a debit posting to "Reserve for Dividend No. ," is made to the proper subsidiary ledger account.

Special Dividend Cheques are drawn against the Dividend Account in favor of each stockholder. These cheques are entered in a Dividend Cheque Register before they are mailed to the individual stockholders in order to provide a record for use in reconcilement of each dividend account with the bank.

Posting of Cash Book Credits.—The Cash Book is balanced and closed at the end of each month, and a summary of the credits is made in like manner as of the debits, as follows:

Account	Folio	Amount	
		Debit	Credit
Accounts Payable, Bills Audited.....	15	$2,085,019.24	
Reserve for Dividends from Surplus.....	127	350,000.00	
Reserve for Dividends from Depletion...	128	350,000.00	
Cash.....	12		$2,785,019.24
Cash on Hand December 31, 1918..			707,935.32
			$3,492,954.56

Only the totals as shown are posted to the General Ledger Accounts. The individual entries on the credit side may be posted to subsidiary ledger accounts, or simply be supported by separate records of Bills Audited, Dividends, etc.

Reconcilement of Cash Account.—At the end of each month the bank statement or statements, and cancelled cheques of the Treasurer's Account are checked against the Cash Book Record of cash received and disbursed, and the amount of outstanding cheques if any, ascertained and recorded. Also, any discrepancy that is found is immediately adjusted, and a Reconcilement Statement is made up similar to Form 44.

At the same time a reconcilement is made up for each of the dividend accounts as long as any dividend cheques are outstanding. If a dividend cheque is not cashed within a reasonable time, the matter should be called to the attention of the stockholder and arrangements made to close the account.

It is very seldom that a cheque issued by the Treasurer is not presented for payment. However, should a treasurer's cheque still be outstanding after four years from date of issue, and the person to whom the cheque was issued cannot be located, it is best to clear the records by a charge to Cash for the amount of the cheque and credit Refunds and Discounts.

When dividend cheques have been returned and the stockholder cannot be located, they may be taken up in the Administrative Cash and the amount credited to Reserve for Dividends Unclaimed and so shown on the Balance Sheet.

NOTES RECEIVABLE

It is not customary to accept notes from customers in lieu of cash payments. However, occasionally a customer becomes temporarily financially unable to meet his obligations, and an interest bearing note is accepted. When this is done a journal entry is made debiting Notes Receivable, and crediting Operating Sales Settlements. Upon the Operating Books an entry is made the same as if the payment had been made in cash.

CHAPTER XVIII

DIVIDENDS

The dividend distributions made by mines consist of three kinds, as follows:

1. Cash Dividends from Earnings,
2. Stock Dividends from Earnings,
3. Capital Dividends.

The present practice of mining companies is to deduct from gross income the total amount of production expense including taxes and depreciation of equipment, and to divide the remaining amount of income into net earnings and reserve for depletion. Any dividends made from the net earnings are known as Dividends from Earnings, and any dividends from Depletion Reserves are known as Capital Dividends.

Under the present federal tax laws and Treasury Department's Regulations No. 45, "a dividend means any distribution made by a corporation, other than a personal serivce corporation, to its stockholders or members, whether in cash or in other property or in stock of the corporation out of its earnings or profits accumulated since February 28, 1913."

While under the federal tax laws capital distributions out of Depletion Reserves are not recognized as dividends subject to tax, nevertheless they will be considered as made from earnings or profits and be taxable unless all earnings and profits have first been distributed. Also any undistributed earnings or profits accumulated prior to March 1, 1913, may be distributed in stock dividends or otherwise exempt from federal tax, provided the earnings and profits accumulated since February 28, 1913, have been distributed.

Cash Dividends from Earnings.—The usual dividends distributed by mining companies consist of cash dividends paid from earnings of the current year, or from surplus and undivided profits on hand at end of the preceding year.

It is customary to declare a dividend approximately 30 days prior to date of payment and to specify the date on which the stock records will be closed in order to allow time for transfers of stock, and to make and distribute dividend cheques.

A statement is made up and furnished the directors at each meeting showing the amount of actual or estimated earnings undistributed for the current year, the net cash available for dividends; the surplus and

undivided profits the beginning of the year; etc., for use in making dividend decision.

Upon the declaration of a dividend by the directors, a journal entry is made for posting to the General Ledger, as follows:

Dividends from Surplus	$262,500.00	
To Reserve for Dividend from Surplus		$262,500.00
"Dividend No. 25 of 75 cts. per share, declared September 20, 1918, to stockholders of record of September 30, 1918, payable October 19, 1918."		

Sometimes a dividend is declared at the end of one year, payable in the first month of the next year, as

Dividend from Surplus	$175,000.00	
To Reserve for Dividend from Surplus		$175,000.00
"Dividend No. 26 of 50 cts. per share declared December 20, 1918, to stockholders of record of December 31, 1918, payable January 20, 1919."		

In such cases the amount of the reserve to cover the dividend is shown on the Balance Sheet at the end of the year as Reserve for Dividend from Surplus No. 26.

The account Dividend from Surplus is closed into the Surplus Account at the end of each fiscal year, while the account Reserve for Dividend from Surplus is closed by posting from entry in the Cash Book made at the time a check is drawn for the amount of the dividend as explained under "Cash Disbursements for Dividends."

STOCK DIVIDENDS FROM EARNINGS

When it is desired to keep an unusual amount of earnings in the business for new equipment or expansion of operations, etc., it is occasionally decided to declare a stock dividend. This saves the distributing of the earnings and later the issuing of additional stock or bonds to furnish the funds required.

The issuing of stock dividends by a concern that is making large earnings is a very simple method of raising capital and in addition furnishes the stockholders with certificates representing the amount of earnings absorbed by the business. These certificates of shares can be sold by the stockholder if he desires to convert his stock dividend into cash. This could not be done by the stockholder if no stock dividend were issued for the amount of the surplus and undivided profits that have been absorbed into the business.

When a stock dividend is declared the amount of the surplus that has been capitalized is transferred to the Capital Stock Account by a journal entry debiting Surplus and crediting Capital Stock.

Stock dividends do not reduce the amount of the Invested Capital, which is an advantage when the earnings are sufficient to require the

payment of an excess profit tax. Neither are such dividends taxable to the stockholder until sold by him.

Dividends from Assets.—During the war some of the larger mining companies invested heavily in Liberty Bonds, which have since depreciated in value. In some cases instead of liquidating these bonds and paying cash dividends, the bonds have been distributed pro-rata to the stockholders. When this is done, the account representing the security distributed is credited and Surplus is debited for the amount of the distribution.

Capital Dividends.—In mining, a Capital Dividend is either a distribution to the stockholder in liquidation of the assets and business of a corporation upon surrender of his interest in the corporation, and closing up of the business, or is a dividend paid out of Depletion Reserves as these are accumulated.

A Capital Dividend is not taxable income provided, in the case of dividends out of Depletion or Depreciation Reserve, that the surplus and undivided profits first have been distributed.

However, as a Capital Dividend decreases the amount of the invested capital for use in determining the excess profits tax, such dividends are not disbursed unless the invested capital can be decreased without increasing the federal taxes.

When such dividends are declared, a journal entry for posting to the General Ledger is made, as follows:

Capital Dividends from Depletion.....	$262,500.00	
To Reserve for Dividend from Depletion.....		$262,500.00
"Capital Dividend No. 8, of 75 cts. per share declared September 20, 1918, to stockholders of record of September 30, 1918, payable October 19, 1918."		

The dividend from Depletion account is closed either into the Property Appreciation Reserve, or the Capital Stock Account, depending upon whether paid out of depletion of investment or depletion of appreciation. Therefore, this is another reason for the segregating of Depletion Reserve into Depletion of Investment and Depletion of Appreciation.

When the Depletion Reserve is so divided and Capital Dividends are declared and paid, they can be declared first as paid out of realized appreciation, as shown by the Reserve for Depletion of Appreciation. The Capital Dividends then can be charged to Property Appreciation Reserve until all of the Property Appreciation Reserve has been realized and liquidated. This leaves the original invested capital intact for reinvestment in new properties, or to be distributed to stockholders upon liquidation of the business.

When a Capital Dividend is declared and paid out of realized appreciation, the amount of the account Capital Dividends from Depletion is closed at the end of the year by a journal entry, as follows:

Property Appreciation Reserve	$1,400,000.00	
To Capital Dividends		$1,400,000.00

"Reduction of Property Appreciation equal to the Amount of Capital Dividends declared during the year."

The account Reserve for Dividends from Depletion is closed upon payment of the dividend by posting from the Cash Book, as in the case of Cash Dividends from Earnings.

Reducing the Depletion Reserve.—As such Capital Dividends are paid out of Depletion Reserves, and as the dividends were declared as paid out of Reserve for Depletion of Appreciation, it is necessary to reduce the Depletion Reserve by journal entry, as follows:

Reserve for Depletion of Mine Appreciation	$1,400,000.00	
To Mine Property Appreciation		$1,400,000.00

"Reducing the Reserve for Depletion of Mine Appreciation and Mine Property Appreciation an amount equal to Capital Dividends distributed."

It is necessary to reduce these accounts an amount equal to Capital Dividends disbursed until all of the Property Appreciation has been realized and distributed. If any further Capital Dividends are paid out of Reserve for Depletion of Investment, then the Reserve for Depletion of Investment and Mine Property Investment accounts will have to be reduced a like amount. The Capital Dividends Account covering such further disbursements will be a charge against the Capital Stock Account.

Until the present Excess Profit Tax is repealed, no Capital Dividends should be paid unless the earnings on the reamining invested capital on normal prices and production will be less than 8 per cent. Otherwise the business will be forced to pay an Excess Profits Tax as a result of having disbursed part of its invested capital.

CHAPTER XIX

ADMINISTRATIVE BALANCE SHEET

A statement is taken from the Administration Ledger after posting all entries that have been made prior to the determination of the Yearly Income or Profit and Loss, and the balancing of the Surplus Account.

ADMINISTRATIVE TRIAL BALANCE

This is obtained by compiling the balances upon the Administrative Ledger, which will give a statement, as follows:

ADMINISTRATIVE TRIAL BALANCE BEFORE ABSORBING OPERATING RESULTS

	Debits	
Administrative Expense	$	83,801.64
Federal Taxes		38,410.67
Cash		707,935.32
Accounts Receivable		17,844.65
United States Liberty Bonds		786,428.15
Dividends from Surplus		437,500.00
Reserve for Depletion of Mine Appreciation		169,952.04
Mine Property Investment		3,022,500.00
Mine Property Appreciation		3,926,515.62
General Office Equipment		851.70
Operating Account, Current Year		1,450,000.00
Operating Account, Previous Year		933,611.77
		$11,575,351.56
	Credits	
Interest on Investments	$	30,457.12
Interests on Bank Deposits		23,051.55
Reserve for Unclaimed Dividends		118.00
Reserve for Federal Taxes		38,410.67
Reserve for Dividends from Surplus		175,000.00
Reserve for Depletion of Mine Investment		697,983.51
Appreciation Reserve		3,926,515.62
Capital Stock Issued		3,500,000.00
Earned Surplus		1,003,128.31
Operating Sales Settlements		2,180,686.78
Receipts from Sales Agent		0.00
		$11,575,351.56

This statement is taken to ascertain that the ledger is in balance and that all administrative transactions prior to determining profit and loss have been recorded. This statement shows the Reserve for Depletion of Appreciation as a debit, due to the fact that the Current Year's Reserve has not been transferred from the Operating Books.

Before the Income can be determined the results of operations must be taken up on the Administrative Books.

CLOSING THE OPERATING ACCOUNT

In order that the results of operations may be taken up on the Administrative Books and the operating accounts closed out, the statement of accounts furnished by the Operating Department is entered in the journal for posting to the Administrative General Ledger, as follows:

STATEMENT OF OPERATING ACCOUNTS BEFORE CLOSING OPERATING BOOKS
FOR YEAR 1918

Debits		
Total Operating Expense:		
Copper	$1,516,189.88	
Lead	250,882.50	$1,767,072.38
Depreciation of Equipment:		
Mine	18,000.00	
Mill	18,474.50	36,474.50
Depletion:		
Of Copper Ores	498,614.51	
High-grade Lead	6,102.46	504,716.97
Cash at Mine		52,383.78
Accounts Receivable, Mine		5,736.57
Ores on Hand at Cost		4,466.46
Unsold Metal in Transit at 17.643 cts		489,373.42
Sold Metal due for Shipment		212,920.07
Due for Gold and Silver Sold		23,467.54
Lead Ore Production at Cost		4,536.91
Lead Ore in Process at Cost		863.73
Lead Concentrates at Cost		53,874.04
Materials and Supplies		139,521.88
Suspense		8,735.91
Construction and Equipment		547,462.23
Treasurer, Current Year		730,686.78
		$4,582,293.17
Credits		
Gross Value Production		
Copper	$2,346,057.02	
Lead	263,395.25	$2,609,452.47
Miscellaneous Operating Earnings		5,121.89
Current Accounts Payable		100,124.61
Bullion Freight and Refining Not Due		45,868.38
Selling Expense Not Due		15,713.31
Reserve for Taxes		36,760.58
Reserve for Accidents		68,618.82
Reserve for Depreciation of Equipment		262,304.37
Reserve for Depletion		504,716.97
Treasurer, Previous Year		933,611.77
		$4,582,293.17

All the items on this statement having been posted, it is necessary to close the Operating and Treasurer's Accounts. To do this, the Operating Account, Current Year, is credited with the amount of the Operating Sales Settlements. This will leave a credit balance in the Operating Account, Current Year of $730,686.78 and offsets the debit balance in the Operating Treasurer's Account, Current Year, for like amount. These latter accounts are then closed by entry, as follows:

Operating Account, Current Year	$730,686.78	
To Treasurer, Current Year		$730,686.78
"Closing out the connecting accounts between the Operating and Administrative Books, for the Current Year."		

A similar entry is made to close out the Operating Account and Treasurer's Account for the previous year.

REALIZED APPRECIATION

As the depletion taken up on the Operating Books and transferred to the Administrative Books is for the total amount, it is necessary to divide this into Depletion of Investment and of Appreciation, by journal entries, as follows:

Depletion of Mine Investment	$182,717.08	
Depletion of Mine Appreciation	321,999.89	
To Depletion		$504,716.97
"Proportioning the amount of depletion applicable to investment and to appreciation of property value."		

The Reserve for Depletion is also divided in like manner in order to determine the realized appreciation.

Reserve for Depletion	$504,716.97	
To Reserve for Depletion of Investment		$182,717.08
Reserve for Depletion of Appreciation		321,999.89
"Dividing the Yearly Depletion Reserve between Investment and Appreciation."		

The Depletion Charge could be divided when it is taken up on the Operating Books each month, but as it is desired only to ascertain each month what amount of earnings is available for dividends, the complete charge serves the purpose and saves bookkeeping.

As the recent requirement of the Regulations of the Treasury Department relating to Return of Income, is that Depletion can be taken only on production as sold, the depletion should be so charged, or an adjustment will have to be made when return of income is filed.

ADMINISTRATIVE BALANCE SHEET BEFORE CLOSING

In order to ascertain that the ledger is in balance and to obtain a statement for use in closing the books for the year, another statement of balances is taken from the ledger, as follows:

ADMINISTRATIVE BALANCE SHEET BEFORE CLOSING FOR THE YEAR 1918

Debits

Total Operating Expense		$ 1,767,072.38
Total Administrative Expense		83,801.64
Depreciation of Equipment		36,474.50
Depletion of Mine Investment		182,717.08
Depletion of Mine Appreciation		321,999.89
Federal Taxes		38,410.67
Dividends from Surplus		437,500.00
Cash		
Mine	$ 52,383.78	
Treasurer	707,935.32	760,319.10
Accounts Receivable		
Mine	$ 5,736.57	
Treasurer	17,844.65	23,581.22
Ores on Hand at Cost		4,466.46
Unsold Metal In Transit at 17.643 cts		489,373.42
Sold Metal Due for Shipment		212,920.07
Due for Gold and Silver Sold		23,467.54
Lead Ore Production at Cost		4,536.91
Lead Ore In process at Cost		863.73
Lead Concentrates at Cost		53,874.04
Materials and Supplies		139,521.88
Suspense		8,735.91
United States Liberty Bonds		786,428.15
Mine Property Investment		3,022,500.00
Mine Property Appreciation		3,926,515.62
Construction and Equipment		
Mine	$547,462.23	
General	851.70	548,313.93
		$12,873,394 14

Credits

Gross Value Production		$ 2,609,452.47
Miscellaneous Operating Earnings		5,121.89
Interest on Investments		30,457.12
Interest on Bank Deposits		23,051.55
Current Accounts Payable		100,124.61
Bullion Freight and Refining Not Due		45,868.38
Selling Expense Not Due		15,713.31
Reserve for Taxes		
Operating	$ 36,760.58	
Federal	38,410.67	75,171.25
Reserve for Accidents		68,618.82
Reserve for Unclaimed Dividends		118.00
Reserve for Dividend from Surplus		175,000.00
Reserve for Depletion of Mine Investment		880,700.59
Reserve for Depletion of Mine Appreciation		152,047.85
Reserve for Depreciation of Equipment		262,304.37
Appreciation Reserve		3,926,515.62
Capital Stock Issued		3,500,000.00
Earned Surplus		1,003,128.31
		$12,873,394.14

This statement shows the total expense and revenue and dividends paid from Surplus for the year, as well as the assets and liabilities, etc., and gives all the information necessary for making up the Income or Profit and Loss Account and the determining of the Earned Surplus at the end of the year.

CHAPTER XX

YEARLY INCOME OR PROFIT AND LOSS AND SURPLUS

PROFIT AND LOSS

The method of determining income from mines has gone through a process of evolution during the past five years, due principally to the requirements of recent federal and state tax laws and the development of accounting and costing procedure.

Prior to the enactment of the present federal income and war profits tax laws of October 3, 1917, the income of mines in excess of the total production expense, and a nominal deduction for depreciation of equipment was considered net income, or net earnings, and was distributed as dividends earned either in cash or stock. While it was realized that a portion of the earnings so determined represented a liquidation of the investment in the mine property as a result of the depletion of ores, nevertheless as the tax laws did not recognize such a deduction prior to September 8, 1916, very few, if any, of the metal mines set up on their books a reserve for depletion of mines by a charge against gross income. Therefore, all the net returns were considered net income or net earnings and so distributed or carried as Surplus and Undivided Profits.

This did not result in any loss due to tax assessments either to the business or its stockholders until the enactment of the Special Excise Tax on Corporations of August 5, 1909, fixing a tax of 1 per cent on net income over $5,000. However, this law did not recognize depletion as a deduction from gross income. The Federal Income Tax Law of October 3, 1913, assessed a tax of 1 per cent on total net income, but did not recognize depletion as an allowable deduction in determining net income. As the tax was small and the determination of depletion deduction was difficult, nothing was done to cure the defect in the law.

However, the passage of the Income Tax Law of September 8, 1916, as amended by Act of October 3, 1917, levied a 2 per cent income tax on total net income, and an additional 4 per cent war tax, and provided, "in the case of mines a reasonable allowance for depletion" to be made under rules and regulations to be prescribed by the Secretary of the Treasury. The mines then realized that to prevent payment of unnecessary taxes on income from operations and to protect stockholders from paying taxes upon distribution of liquidated capital, that the proper charge for depletion must be determined and deducted from gross income.

However, the wording of the clause in the 1917 Law covering the depletion allowance was ambiguous and the Treasury Department's rulings in regard thereto were uncertain, and the matter of determining depletion was not satisfactorily settled until the passage of the Revenue Act of 1918, and the issuance of Treasury Department's Regulations No. 45.

At the present time all mines whose operations result in net income determine their depletion and set up a reserve for depletion by a charge against gross income.

Accounting of mining operations has so developed that a uniform Income or General Profit and Loss Account now can be adopted.

Items That Should Appear in the Profit and Loss Account.—The items that enter into the Profit and Loss Account consist of five groups, one credit and four debits, as follows:

1. Revenue or Income; Credit,
2. Expense; Debit,
3. Losses; debit,
4. Capital Returned; debit,
5. Federal Income and Profits Taxes; debit.

The items that make up the Revenue or Income group should be all the revenue received by the business plus the amount of unsold ore and bullion, etc., on hand at end of year and less the amount of unsold ore, bullion, etc., on hand the beginning of the year and the items composing the Expense groups should be all charges that each year's operations should bear, regardless of whether or not all the revenue is taxable income and all the expense will be allowed in determining the income tax.

If, during the year, there has been any losses that should not be charged to production expense, such should be shown under Losses in the Profit and Loss Account.

All items of revenue that are exempt from taxation and any expense and losses that will not be allowed in determining net taxable income, should be so carried in separate general or subsidiary accounts as to be quickly ascertained in making up the statement of taxable income.

Determining the Yearly Profit and Loss.—In closing the books to determine the yearly Profit or Loss, the "Administrative Balance Sheet Before Closing for the Year" is consulted and a journal entry is made first closing out the revenue or income accounts, as follows:

Profit and Loss	$2,668,083.03	
To Gross Value of Production		$2,609,452.47
Miscellaneous Operating Earnings		5,121.89
Interest on Investments		30,457.12
Interest on Bank Deposits		23,051.55

"Closing out the Yearly Revenue to Profit and Loss."

For the Expense, Profit and Loss is debited and Total Operating and Total Administrative Expense is credited. The Capital Returned is closed out by debiting Profit and Loss and crediting Depreciation of Equipment and Depletion of Mine Investment and Mine Appreciation. The Federal Taxes are then credited and Profit and Loss debited. These entries are posted and the Income or Profit and Loss Account ruled, and a statement made up, as follows:

INCOME OR PROFIT AND LOSS ACCOUNT

FOR YEAR—1918

Income			
Gross Value of Production		$2,609,452.47	
Miscellaneous Operating Earnings		5,121.89	
Interest on Investments		30,457.12	
Interest on Bank Deposits		23,051.55	$2,668,083.03
Expense			
Total Operating Expense		$1,767,072.38	
Total Administrative Expense		83,801.64	1,850,874.02
Gross Operating Returns			$ 817,209.01
Capital Returned			
Depreciation of Equipment	$ 36,474.50		
Depletion of Mine Investment	182,717.08	$ 219,191.58	
Depletion of Mine Appreciation		321,999.89	541,191.47
Net Income			$ 276,017.54
Federal Taxes			38,410.67
Net Profit for Year to Surplus Account			$ 237,606.87
At rate per share of			

It is not necessary to detail the expense charges, as this information is shown on the Cost Statement furnished the directors, which is embodied in the Yearly Report to Stockholders.

SURPLUS

The profit for the year amounting to $237,606.87 is now transferred from the Income or Profit and Loss Account to Surplus.

The dividends from earnings declared during the year amounting to $437,500.00 are closed into Surplus, and the balance left in this account appears on the Balance Sheet as Surplus.

Should the results of any year's operatings show a loss in excess of the balance in the Surplus Account, the Surplus Account would show a debit and appear on the Balance Sheet as a deficit.

In reporting dividends paid out of surplus for purpose of determining taxable income, any dividend distributed during the first 60 days of any taxable year is deemed to have been made from earnings or surplus accumulated during the preceding taxable year. Any distribution made during the remainder of the taxable year is deemed to have been made

from earnings accumulated between the close of the preceding taxable year and the date of distribution to the extent of such earnings.

Therefore, at the end of each year the stockholders should be advised of the amount of dividends paid out of the current year's earnings and previous year's surplus.

Adjusting the Surplus Account.—In determining whether or not the income for the year is subject to excess profits tax, the Surplus for use as Invested Capital must be analyzed and made to conform to the requirements of the Treasury Department, as set forth in Regulations No. 45. When the amount of Surplus as determined according to the Treasury Department's Regulations does not coincide with the amount as determined by the accounting methods used in the business, as the result of improper accounting it is best to correct the accounting methods. When there is a difference due to refusal to allow certain items of expense or depreciation that it is considered to the best interests of the business to charge to operations, it is best to keep a subsidiary surplus account, or a memorandum of the adjustments to be made to bring the Surplus to the amount allowed by the Treasury Department in determing taxable income and invested capital.

Surplus Account for the Year.—An analysis of the Surplus Account after closing would give a statement, as follows:

SURPLUS ACCOUNT

Balance, January 1, 1918	$1,003,128.51	
Net Profit for Year 1918	237,606.67	$1,240,735.18
Dividends Nos. 23 to 26		437,500.00
Balance, December 31, 1918		$ 803,235.18

CHAPTER XXI

BALANCE SHEET

All the business transactions for the year having been properly recorded upon the books according to accounting principles and approved accounting procedure, and the results of the year's operations and dividend disbursements having been determined, as shown by the Profit and Loss Statement and the Surplus Account, it is now necessary to make up a Balance Sheet from the balances appearing on the General Ledger in proper form so as to show the true condition of the business at the end of the year.

GROUPING OF BALANCE SHEET ITEMS

In taking the balances from the ledger to make up the Balance Sheet, the items should be grouped so as to show the true condition of the business and to enable the President, Treasurer and the other officers and directors, to readily ascertain the facts as to each group of assets and liabilities of the business.

Each item appearing on the Balance Sheet should be included in the proper one of the following groups:

Assets

1. Current or Operating Assets
2. Investment Assets
3. Deferred Charges
4. Property Investment or Fixed Assets
5. Property Appreciation

Liabilities

1. Current or Operating Liabilities
2. Investment Liabilities
3. Deferred Credits
4. Property Reserves
5. Appreciation Reserve
6. Capital Issued
7. Surplus

Any item carried on the ledger belongs in some one of the above groups, and sufficient attention should be given each item to insure that it is properly grouped.

ARRANGEMENT OF GROUPS AND ITEMS

The arrangement of the groups of assets and liabilities can be made as above, or to conform to the individual ideas of the Treasurer or President of each business. The arrangement as shown places the most important group, as far as operations are concerned, *i.e.*, Current or Operating Assets and Liabilities, first, and the other groups follow in natural order as to their importance from an operating standpoint.

In arranging the items composing each group the most important item of the group should appear first in each group, and the other items should follow according to importance. The most important item does not necessarily mean the largest amount. Cash is always the most important item of Current or Operating Assets, regardless of the amount of cash on hand.

BALANCE SHEET STATEMENT

The items appearing upon the ledger having been arranged into groups, and the groups and items arranged as to importance from an operating standpoint, a balance sheet statement would be obtained, as follows:

BALANCE SHEET AT CLOSE OF BUSINESS, DECEMBER 31, 1918

Assets

Current or Operating Assets			
Cash		$ 760,319.10	
Current Accounts Receivable		23,581.22	
Sold Metal Due for Shipment		212,920.07	
Due for Gold and Silver Sold		23,467.54	
Unsold Metal in Transit at Cost		489,373.42	
Lead Concentrates at Cost		53,874.04	
Lead Ore Production and In Process		5,400.64	
Ores on Hand at Cost		4,466.46	$ 1,573,402.49
Investment Assets			
United States Liberty Bonds			786,428.15
Deferred Charges			
Materials and Supplies		$ 139,521.88	
Suspense		8,735.91	148,257.79
Property Investment			
Construction and Equipment		$ 548,313.93	
Mine Property Investment		3,022,500.00	3,570,813.93
Property Appreciation			
Mine Property Appreciation		$5,326,515.62	
Less Depletion Distributed		1,400,000.00	3,926,515.62
			$10,005,417.98

Liabilities

Current or Operating Liabilities			
Current Accounts Payable		$ 100,124.61	
Accrued Accounts Payable		136,752.94	
Reserve for Dividend from Surplus		175,000.00	
Reserve for Accidents		68,618.82	
Reserve for Unclaimed Dividends		118.00	$ 480,614.37
Property Reserves			
Reserve for Depletion:			
Of Mine Investment	$880,700.59		
Of Mine Appreciation	152,047.85	$1,032,748.44	
Reserve for Depreciation of Equipment		262,304.37	1,295,052.81
Appreciation Reserve			
Property Appreciation Reserve		$5,326,515.62	
Less Capital Dividends Paid		1,400,000.00	3,926,515.62
Total Liabilities			$5,702,182.80
Invested Capital			
Capital Stock Issued		$3,500,000.00	
Earned Surplus		803,235.18	4,303,235.18
			$10,005,417.98

BALANCE SHEET SCHEDULES

Schedules analyzing the items appearing in the Current Asset and Liability Groups, as shown by the Operating Schedules in Chapter XII should accompany the Balance Sheet and should give the information necessary, to enable the Treasurer to determine whether or not the Current Assets will take care of current and investment liabilities as they become due, and what amount of cash, if any, will be available for dividend disbursements.

Also, it is well to make up schedules of Investment Assets, of the Deferred Charges, and of the Property Investment in Construction and Equipment.

The Schedule of Investment Assets will act as a guide in determining the possible future income from investments. The Schedule of Materials and Supplies should be as to stocks only and not individual items. This schedule is of value for comparison with past schedules and in determining future policy of purchasing. The Schedule of Construction and Equipment is of use for reference as to cost of equipment and the undepreciated balances, in determining amount of insurance that should be carried, the amount of investment that would be scrapped if replaced by more efficient equipment, whether or not the rate of depreciation being charged is too large or too small to take care of actual wear and tear and obsolesence, etc.

To obtain the proper perspective of the business from the Balance Sheet and Schedules and the Profit and Loss Account, the Cost Sheets and Production Statements, as well as the Statement of Ore Reserves and the present condition and possible future trend of the metal market also must be considered.

When furnished with a Balance Sheet and Profit and Loss Statement properly drawn, together with Statements of Costs, Production and Ore Reserves, the directors are fully informed as to the results and condition of their business, and are in position to balance this information against the present market conditions and to determine intelligently what policy should be pursued for the coming year.

It will be noted that the Mine Property Appreciation and the Property Appreciation Reserve Accounts are shown for the total amount with the amount of Capital Distributions deducted. It is best so to show these accounts on the Balance Sheet in order that the amount of Capital Distributions will be known.

INVESTED CAPITAL

The Invested Capital appearing on the Balance Sheet is not necessarily the amount that is used in determining whether or not the income for the year shall bear the Excess Profits Tax. The amount of Invested Capital in the business, as shown on the Balance Sheet, must be adjusted

to meet the requirements of the Treasury Department's Regulations No. 45. Due to the fact that the amount of Undistributed Realized Appreciation, the Reserve for Accidents, and the Reserve for Taxes, may be added to the Surplus when determining the amount of Invested Capital for use in ascertaining the Excess Profits Tax, it is best to keep a memorandum of the allowable Invested Capital and to allow the ledger accounts to stand as created.

RE-OPENING THE CONNECTING ACCOUNTS

After the Income for the year has been determined and the Balance Sheet drawn, the connecting Operating Accounts and the Treasurer's Accounts are re-opened by reversing the closing entries, as follows:

Treasurer, Current Year	$730,686.78	
To Operating Account, Current Year		$730,686.78
"Opening up the Current Year Operating Account."		
Operating Account, Previous Year	$933,611.77	
To Treasurer, Previous Year		933,611.77
"Opening up the Previous Year's Operating Accounts."		

The connecting Operating Accounts having been re-opened, the "Current Year's Accounts" preparatory for the operations of the new year are closed into the Previous Year's Accounts by entries, as follows:

Treasurer, Previous Year	$730,686.78	
To Treasurer, Current Year		$730,686.78
"Closing out the Current Year Treasurer's Account to coincide with Operating Books."		
Operating Account, Current Year	$730,686.78	
To Operating Account, Previous Year		$730,686.78
"Closing the Administrative Current Year Account."		

In order to bring the Operating Account on the Administrative Books into agreement with the Treasurer's Account on the Operating Books, the results of the year's production operations, as well as the year's depletion as shown by the Operating Books, is credited to the Treasurer's Account that has been transferred from the Operating Books, to the Administrative Books by entries, as follows:

Operating Account, Previous Year	$306,310.51	
To Treasurer, Previous Year		$306,310.51
"Crediting the Operating Account Treasurer with amount of operating profit for year 1918, absorbed from Operating Books."		
Operating Account, Previous Year	$504,716.97	
To Treasurer, Previous Year		$504,716.97
"Crediting the Operating Account Treasurer with amount of 1918 depletion token up on Operating Books and transferred to Administrative Books."		

Upon posting these entries, it will be found that the Administrative "Operating Account" and the Operating "Treasurer's Account" each show a balance of $1,013,952.47.

Closing off the Operating Accounts.—In order to close the Operating Accounts appearing on the Administrative Ledger, a journal entry of the remaining operating accounts that were not closed to Profit and Loss is made, as follows:

Cash at Mine	$	52,383.78
Accounts Receivable, Mine		5,736.57
Ores on Hand at Cost		4,466.46
Unsold Metal In Transit		489,373.42
Sold Metal Due for Shipment		212,920.07
Due for Gold and Silver Sold		23,467.54
Lead Ore Production at Cost		4,536.91
Lead Ore in Process at Cost		863.73
Lead Concentrates at Cost		53,874.04
Materials and Supplies		139,521.88
Suspense		8,735.91
Construction and Equipment		547,462.23
		$1,543,342.54
Current Accounts Payable	$	100,124.61
Bullion Freight and Refining Not Due		45,868.38
Selling Expense Not Due		15,713.31
Reserve for Taxes		36,760.58
Reserve for Accidents		68,618.82
Reserve for Depreciation of Equipment		262,304.37
Treasurer, Previous Year		1,013,952.47
		$1,543,342.54

"Closing the Operating Accounts from the Administrative Ledger."

There will now appear upon the Administrative Ledger only the balances of the Administrative Accounts, which, together with the Operating Accounts closed out, should be ruled preparatory to the work of the new year.

ACCOUNTING FOR HOLDING COMPANIES

It is the practice of some of the larger mining companies having numerous mines, smelters, etc., to have a separate organization for each mining group and to have a holding company into which the operating results of each group is delivered.

In such cases the same accounting procedure is followed as herein illustrated, except the Administrative Accounting of the holding company will have a separate connecting account for each subsidiary company, and will carry separate receipt and administrative expense accounts for each subsidiary company.

The general income or profit and loss account and the general balance sheet will be consolidated in the same manner as herein illustrated for Administrative Accounting.

LIQUIDATION OF THE BUSINESS

As the Accounting required to close a business upon liquidation is simple, it is not necessary to detail the entries. When a development company fails to make a discovery of ore, or has mined out the ore that has been discovered, and is unable to proceed with further development, it is then customary to liquidate the current assets and liabilities and to dispose of the mining equipment. Whatever amount is left after all liabilities have been met and provision made for future taxes is usually distributed to the stockholders as a capital dividend and the capital stock account is reduced a like amount. If the mining property is patented, it is customary to hold the ground, pay the State and County Taxes and keep the corporation in existence by holding a stockholders' and directors' meeting once a year, in order to be able to transfer the mine property should a purchaser be found.

When a development property that has proven a failure or a proven mine that has become exhausted closes its business entirely the assets including mine equipment and mine property are reduced to cash, the liabilities satisfied and any surplus is first distributed as regular dividends, and the remainder as capital dividends, which are delivered upon receipt of stock certificates or evidence of shares of interest from the stockholders or partners and the proper accounts in the stock ledger are debited and closed. If there is sufficient cash to pay capital dividends equal to the amount of the original capital, the capital account is balanced and the general books closed. If there is not sufficient cash to return the original capital in dividends the amount left in the capital account after payment of capital dividends is closed to the profit and loss account as a loss, and the general books as closed will show a loss.

As the amount that can be obtained by sale of mine equipment, after a mine becomes defunct, is usually very small, it is best to charge to operations by depreciation all of the equipment investment before exhaustion, and to consider the receipts from sale of equipment as income.

SECTION 4
COST ACCOUNTING

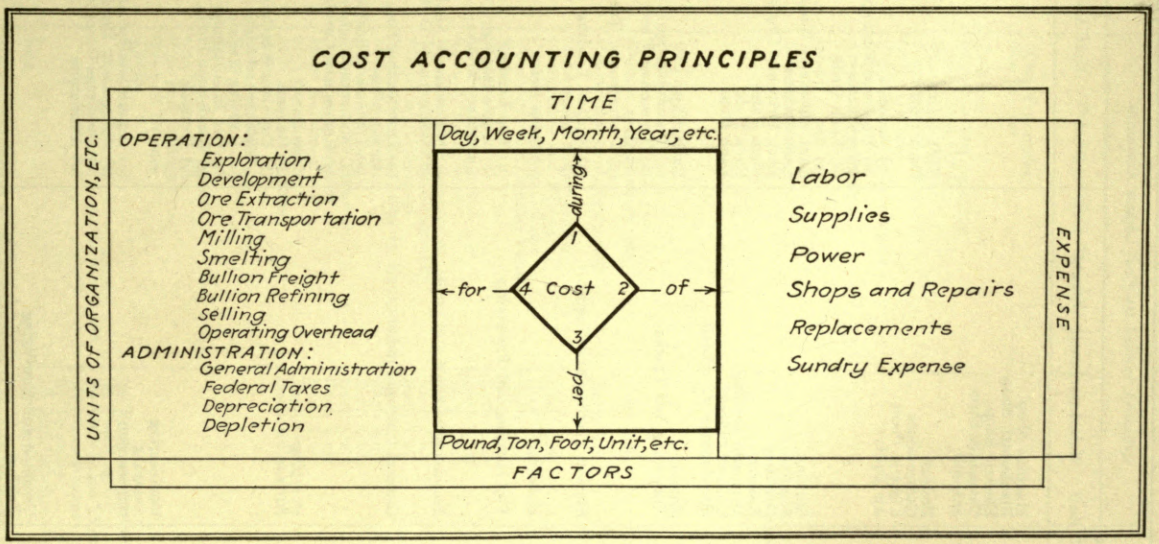

COST ACCOUNTING PRINCIPLES
TIME
UNITS OF ORGANIZATION, ETC.
OPERATION:
Exploration
Development
Ore Extraction
Ore Transportation
Milling
Smelting
Bullion Freight
Bullion Refining
Selling
Operating Overhead
ADMINISTRATION:
General Administration
Federal Taxes
Depreciation
Depletion
Day, Week, Month, Year, etc.
during
for
1
4 Cost 2
of
3
per
Pound, Ton, Foot, Unit, etc.
Labor
Supplies
Power
Shops and Repairs
Replacements
Sundry Expense
EXPENSE
FACTORS

Chart XIII.

Operating Cost Accounts

Chart XIV

General Account Number	Cost Account Number	Cost Ledger Accounts	
		Sub-department Account	Unit Account
6	51	Machine Shop	
	51-*A*	Blacksmith Shop	
	51-*B*	Electric Shop	
	51-*C*	Carpenter Shop	
	52	Sawmill	
7	53	Boilers	Each Unit
	54	Compressors	Each Unit
	55	Electric Plant	
	56	Air Drills	(*a*) General (*b*) Hose and Fittings (*c*) Air Lines (*d*) Each Drill (*e*) Air
17	59	Sinking	Each Shaft and Winze
	60	Stations	Each Station
	61	Drifting	Each Drift and Crosscut
	62	Raising	Each Raise
	63	Diamond Drilling	Each Hole
	64	Churn Drilling	Each Hole
	65	Development Overhead	
18	66	Stoping	Each Stope
	67	Tramming and Tracks	(*a*) Tramming Ore (*b*) Tramming Waste (*c*) Cars (*d*) Underground Tracks
	68	Station Tending and Caging	(*a*) Station Tending (*b*) Caging
	69	Hoisting	(*a*) Each Hoist
	70	Top Landing and Tramming.....	(*a*) Top Landing (*b*) Waste Haulage (*c*) Surface Tracks
	71	Maintenance Shaft and Drifts	(*a*) Maintenance Shaft (*b*) Maintenance Drifts
	72	General Underground	(*a*) Distributing Supplies (*b*) Sampling (*c*) Tools and Sundries (*d*) Water and Lights (*e*) Lamps and Carbide
	73	Pumping	Each Pump
	74	Surface	(*a*) General (*b*) Drymen, Watchmen and Messenger (*c*) Water and Lights (*d*) Building Repairs (*e*) Ore Bins Repairs (*f*) Roads and Trails (*g*) Heating
	75	Engineering	
	76	Assaying	
	77	Supervision	(*a*) Superintendent and Foreman (*b*) Shifters and Head Shifters (*c*) Dwellings Occupied (*d*) Allowances
19	78	Crushing and Conveying	
	79	Tabling	
	80	Grinding	
	81	Desliming and Thickening	
	82	Flotation	
	83	Concentrates Disposal	
	84	Supervision	
	85	General	

Note.—Repairs for Milling must show each Job separately with the proper departmental account name.

Operating Cost Accounts

Chart XIV (*Continued*)

General Account Number	Cost Account Number	Cost Ledger Accounts	
		Sub-department Account	Unit Account
20	86	Mine Tramming	
	87	Ore Freight	
21	88	Treatment	
	89	Sampling and Assaying	
22	90	Accounting Office	
	91	Purchasing Office	
	92	Employment Office	
	93	Office General	
	94	Telegrams and Telephones	
	95	Insurance	
	96	Accident Insurance	
	97	Taxes	
	98	Legal	
	99	Traveling	
	100	Miscellaneous	(*a*) Donations (*b*) Books and Papers (*c*) Allowances (*d*) Sundries (*e*) First Aid (*f*) Experiments
23	101	Bullion Freight	
	102	Refining	
26	103	Repairs of Equipment, etc.	Each Job
27	104	Replacements of Equipment	Each Job
30	110	Hoist and Gallows Frame	
		Compressor and Boilers	Each Unit
	111	Pumps and Pump Column	Each Unit
	112	Condenser and Cooling Pond	Each Unit
	113	Water Tanks	Each Unit
	114	Oil System	Each Unit
	115	Tramway Equipment	Each Unit
	116	Sawmill Equipment	Each Unit
	117	Machine Shop Equipment	Each Unit
	118	Blacksmith Shop Equipment	Each Unit
	119	Electrical Equipment	Each Unit
	120	Engineering and Assaying Equipment	Each Unit
	121	Mine Dwellings	Each Unit
	122	Bins and Trestles	Each Unit
	123	Furniture and Fixtures	Each Unit
	124	Horses and Wagons	Each Unit
	125	Mine Buildings	Each Unit
	126	Mill Equipment	Each Unit
	127	Mill Tracks and Bins	Each Unit
31	131	General	
	132	Iron and Steel	
	133	Explosives	
	134	Fuel	
	135	Lumber and Timber	
	136	Machinery	
	137	Pipe and Fittings	
	138	Oils and Greases	
	139	Tools	
	140	Handling	(*a*) Framing Timber (*b*) Pumping Oil (*c*) Warehouse Expense (*d*) Miscellaneous (*e*) Teaming (*f*) Mill Supplies
	141	Jobs	Each Job

Where it is desired to keep a separate record of the expense, etc., of different divisions of operations, or to keep separate record of the expense, etc., of more than one mine, the same accounts will be used for each division and then combined for entry on the books.

CHAPTER XXII

COST ACCOUNTING

Costing, better known as Cost Accounting, is the dividing of the operations into divisions and departments, and the departments into units; the segregating of the expense chargeable to these divisions, departments and units into the different elements of expense; the determining of the production factors for each division and department, and the operating factors for each unit of organization or equipment; and then showing the resulting cost for each division, department, etc., of each element of expense per production or operating factor for a certain period of time, as shown by Chart XIII.

In order that the organization may get the full benefit of Cost Accounting the one in charge of the costing should be not only well grounded in accounting and business principles but must be familiar with the details of the actual operations of each department, and be able to obtain the cooperation of each of the operating heads. To assist the head of the Cost Accounting Department in obtaining cooperation, he should have the unqualified support of the Manager.

Before analyzing the business for the purpose of determining costs, there should be decided the cost method that is to be used.

METHOD OF COST DETERMINATION

At present, there are two principal methods of determining mining costs:

First: The Departmental Unit Method,
Second: The Departmental Pro-rated Method.

The Departmental Unit Method divides each of the departments of the organization into sub-departments, and the sub-departments into units regardless of whether or not the sub-departments or units are productive or overhead, and segregates the expense into the proper elements and distributes the expense direct to each sub-department and unit.

The Departmental pro-rated Method segregates the departments and distributes the expense in a like manner, but further divides the sub-departments and units into productive and overhead and pro-rates the expense of the overhead departments to the productive departments.

The first method is similar to the Process Method used by manufacturing concerns, while the latter method is of the nature of the Order or

Production Unit Method used in manufacturing when making more than one article for sale when it is necessary to get the exact production cost for each article in order to determine the proper selling price. However, in mining where there is usually only one principal product with sometimes a by-product which is treated as a credit, the Pro-rated Method is not necessary and only increases the amount of bookkeeping and segregating, and makes the costs more complicated and difficult to comprehend and analyze. The Departmental Unit Method is the one best adopted to mining and will be the method illustrated. However, the accountant should be familiar with the Production Unit Method which is useful in determining economic costs.

COST PRINCIPLES

Due to the varying nature of ore deposits, different methods of ore extraction, treatment and disposal of products, there is no uniformity in mine cost accounting procedure at present. However, the basic principles of costing are the same in all cases, as shown by Chart XIII, and should be followed in compiling the costs for each individual organization regardless of the accounts kept, or method used in compiling the costs.

The four basic cost principles should receive consideration in the following order:

First: Units of Organization or Work and Equipment,
Second: Expense,
Third: Cost Factors of Production and Operation, and
Fourth: Time.

UNITS OF ORGANIZATION

The organization units of the business consist of:

Divisions,
Departments,
Sub-departments,
Sub-department Units.

DIVISIONS

By reference to Chart XIII, it will be noted that two divisions are shown, consisting of Administration and Operation. Federal Taxes are an expense item instead of a sub-department of Administration. However, due to the fact that the federal taxes in numerous instances amount to more than the remaining administrative expense, and are something over which the administrative organization has no control, it has become the practice to show such taxes as a separate department of administration, in making up statements of costs for publication.

While Depletion and Depreciation are items of expense chargeable to Operation and not sub-departments of Administration, nevertheless

these items are shown separately as departments of administration instead of including them under expense to be distributed to operation. By so doing there is obtained a separate charge to Profit and Loss, in order to show in the latter account the amount of capital returned as the result of production operations, and depreciation and depletion, being fixed charges, they are best left out of the detail costs, and included in the total cost. Even though the depletion were included in expense and charged to operation, it would be a total fixed operating charge from month to month, and in closing the books at the end of the year, should be taken out of operation and shown as a separate charge to Profit and Loss.

Another reason for considering the depletion charge as a separate department instead of an expense item, is that in numerous cases, the depletion set up on the books includes depletion of appreciation as of March 1, 1913, or as of date of discovery, as well as depletion of actual investment.

In figuring the total costs, only that amount of depletion that represents return of actual investment should be used. If the depletion of appreciation is included a fictitious cost is obtained.

In theory, the depreciation charge should be pro-rated to the production from each unit of operating equipment, and the amount of such depreciation charge should be recorded for use in determining economic costs. However, this is found impracticable in actual mining. Therefore, the depreciation charge is usually handled as a separate department of administration on the cost sheet the same as depletion and for the same reasons.

The Operating Overhead is not a department of the organization, but is the amount of the Operating Overhead expense, which in manufacturing would be distributed to each order or unit of production, but as in mining there is usually produced only one product, the general overhead is carried as a department of the organization and not distributed.

DEPARTMENTS, ETC.

In costing procedure the Operation and Administration Department Accounts established for general accounting are also used for costing. While in general accounting the administration is not divided into departments, and the amount of depreciation, Depletion and Federal Taxes are shown as separate items, in Costing the amounts of Administration, Depreciation, Depletion and Federal Taxes are shown as Administrative Costs, and the operating cost is shown for each operating department, as illustrated on Chart XIII.

The Operating Department Expense Accounts, Prepaid Expense Accounts and Assets Accounts, as shown by Chart IV and the Admin istrative Expense Accounts, as shown by Chart XII, a summary of which is

shown by Chart XIII, having been accepted as control cost accounts, it is necessary to analyze each operating department into its proper sub-departments and sub-departments into as many units as desired for cost purposes, and to establish a chart of Cost Accounts, as shown by Chart XIV. By reference to this chart it will be noted that the units of the Disbursement Accounts of Shops and Power, are also shown as this information must be kept by the Cost Department.

EXPENSE

The cost accounts covering departmental expense, prepaid expense and assets, having been determined, it is then necessary to distribute to these accounts the expense of operation, consisting of direct, indirect, and accrued as shown by Chart IV in the following order:

Labor
Supplies
Bills Audited
Shops
Repairs
Replacements
Suspense
Power
Sundry Expense.

It is necessary to take up the distribution of the expense accounts in the order shown, due to the fact that the Shops Account usually contain charges to be distributed to the prepaid expense accounts of Repairs and Replacements, and the latter accounts contain charges for the Power Account. It is absolutely necessary to record all expense for each period, taking up through the accrued accounts all items that are not due and payable, and making provision for all probable losses by setting up reserve accounts.

SCHEDULE OF CHARGES AND CREDITS TO COST ACCOUNTS

Before taking up the distribution of the expense, there should be established a Schedule of Charges and Credits to Cost Accounts. This will serve as a guide to those making the segregations and insure uniformity in the distribution of the expense from month to month. Such a schedule will have to be made to meet the needs of each individual organization and will not be illustrated herein.

EXPENSE DISTRIBUTION OF LABOR

Each person having direct supervision of labor, in addition to reporting the time of each employe each day for record upon the pay-roll, also reports the distribution of the work of each employe showing the job on which work was done.

For underground mine work, Daily Distribution Reports (Form No. 46) are made for each place or piece of work or job, for each shift. These reports are sorted for each day, balanced against the time reports

and compiled as to shifts upon Monthly Distribution Sheets (Form No. 47), one monthly sheet being used for each Cost Account.

The distribution of Surface and Shop Labor is made for each shift, either by the Foreman or the Timekeeper. The distribution is made upon Daily Labor Report (Form No. 48), one report for each employe, showing the hours worked on each job, his rate, etc. These Daily Labor Reports are summarized as to total expense on each job for each day, and this summary is then balanced against the Daily Time Reports and compiled as to dollars upon Monthly Distribution Sheet (Form No. 49) the cost accounts chargeable being listed on the left of the form and the amount of each day's charge being entered under the proper date.

LEVEL

PLACE , 19

TIMBER	DO NOT WRITE IN THIS SPACE		
		MINERS	
		MUCKERS	
		TIMBERMAN	
		POWDER 1½"	
		" 1"	
		FUSE, FEET	
		CAPS, NO.	
		AIR, HOURS	
		DRILL, MAKE	
		" NUMBER	
		SHOP NUMBER	
		Shift Boss.	

12-12-19 SIM CRANE 36297

FORM 46.—Daily Underground Distribution Report.

Form No. 47 is complete as it provides for all the items of expense, production factors, organization units, and time. Form No. 49 is not complete for each unit as it provides for labor expense only, except in the case of Shops, when the amount of the tools and operating expense is prorated over the labor. The Supplies and other items of expense, other than Labor, are compiled for each unit on Supplies Issued Sheets or from the Bills Audited, Repairs and Replacements Records, etc., which is found to be more desirable.

Check of Labor Distribution.—Each day as the Daily Distribution Sheets are balanced against the Daily Time Reports a summary is made as to shifts of work, at each rate, as shown by Form No. 7, of the distributions for each department, and for each supervisor of each department, when there are more than one crew in each department.

At the end of each month the total of this summary sheet in shifts work is extended into dollars and balanced against the totals of Sheets

UNDERGROUND DISTRIBUTION SHEET

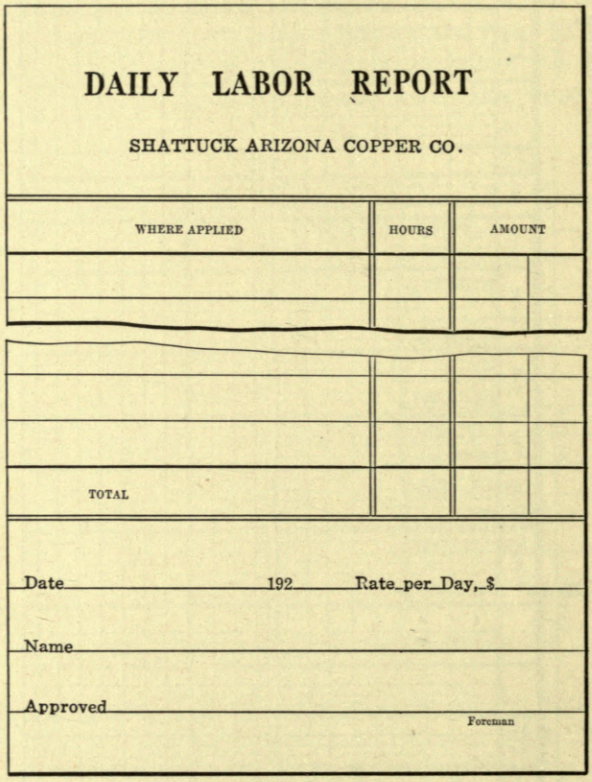
ACCOUNT LEVEL PLACE MONTH

	Date	Miners	Muckers	Timbermen			Powder	Powder	Fuse	Caps	Timber	Stulls	Air	Feet Ext	Cars Cu Ore	Units Copper	% Copper	Cars Lead Ore	Units Lead	% Lead	Date
	1																				1
	2																				2
	3																				3
	4																				4
	5																				5
	6																				6
	7																				7
	Totals to Date																				T
	8																				8
	29																				29
	30																				30
	31																				31
	Totals to Date																				T
	Rate																				R
	Am't																				Amt.
	Total																				T

FORM 47.—Monthly Distribution Sheets.

47 and 49, and against the total pay-rolls. Any discrepancy that is found must be adjusted before any further work is done.

Summary of Labor Distribution.—When the distribution of the labor expense has been balanced with the pay-rolls, a summary of the segregations of underground and surface labor is made in proper order as to expense and asset and indirect disbursement accounts upon Summary of Labor Distribution (Form No. 50). One summary is made for



DAILY LABOR REPORT

SHATTUCK ARIZONA COPPER CO.

WHERE APPLIED	HOURS	AMOUNT	
TOTAL			

Date 192 Rate per Day, $

Name

Approved

Foreman

FORM 48.

the direct labor and one each for the indirect labor of Shops and Power. The indirect labor to Shops and Power is posted direct to these accounts which are distributed later.

This summary is used in compiling the cost data for the detail costs of labor as shown in column 1 and for postings from columns 2, 3 and 4, to the Cost Ledger (Form No. 51).

Posting the Labor Distributions.—There is kept in the Cost Ledger a record of the Indirect Disbursement Accounts of Shops and Power, and of the Prepaid and Asset Accounts, as well as of the Departmental Expense Accounts.

SHOP LABOR . . $_____
OVERHEAD LABOR . $_____
SUPPLIES . . . $_____
BILLS AUDITED . $_____
TOTAL EXPENSE . $_____

DISTIBUTION OF _____ LABOR FOR THE MONTH OF _____ 192_____

ACCOUNT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TOTAL	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total Labor	Total Expense

FORM 49.—Monthly Distribution Sheet.

One cost ledger sheet is used for each cost account, and one sheet for each control cost account, or general ledger account. In posting to the Cost Ledger from summary Form No. 50 the amount shown in column 3 is posted to the control account, and the supporting amounts in column 2 are posted to the cost accounts. To balance the Cost Ledger, the total postings to cost accounts are checked against the totals of the control accounts.

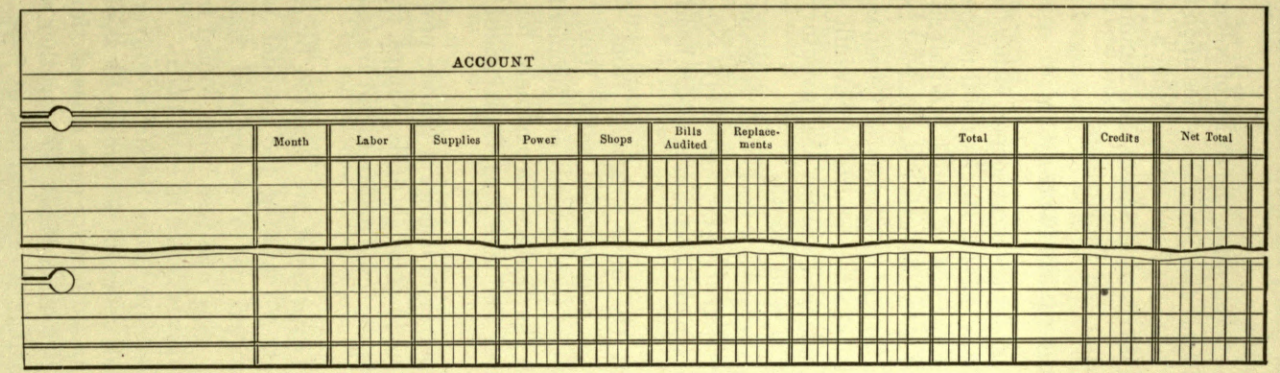
Summary of Labor Distribution

		Cost Data	Cost Accounts	General Ledger Debit Accounts	General Ledger Credit Accounts
Exploration & Development: -				6654 53	
Drifting,			4876 31		
448¾ Miners @	5.35	2400 14			
447¼ Muckers @	5.10	2280 97			
14 Timbermen @	5.60	78 40			
Footage Bonus		136 80			
Raising,			1758 22		
176 Miners @	5.35	941 60			
62¾ Muckers @	5.10	320 02			
69¾ Timbermen @	5.60	390 60			
Footage Bonus		106 00			
Ore Extraction: -				38720 00	
Stoping,			22324 20		
1768⅛ Miners @	5.35	9452 47			
2183½ Muckers @	5.10	1137 13			
308½ Timbermen @	5.60	1727 60			
— Etc —					

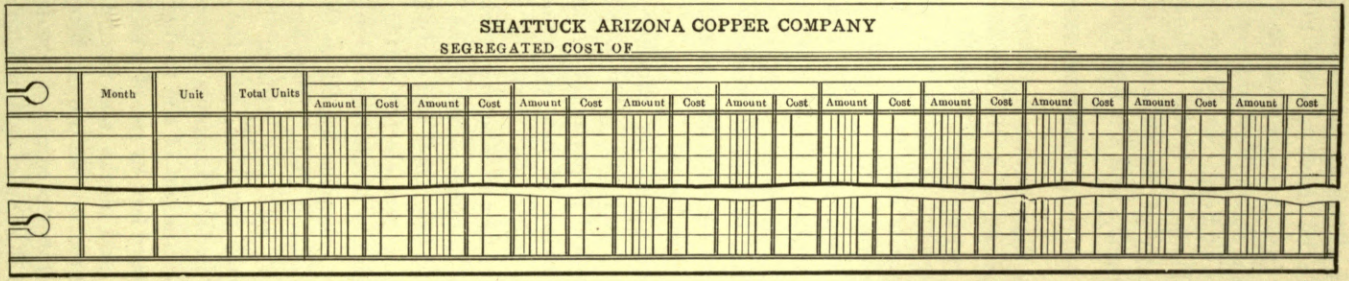
FORM 50.

It will be noted that the Cost Ledger provides one line for each month and sufficient columns to accommodate the expense elements. To obtain an average cost for the year, or the year to date, the columns are added and the total production factors to date divided into the added total.

The detail segregations of each expense element shown in column 1 of form No. 50 are posted first to the monthly detail cost sheets and then to Segregated Cost Sheets (Form No. 52). One line is used for each month on the Segregated Sheets so that the total of each detail segregation may be quickly ascertained any time during the year and the average cost obtained by dividing the total expense by the total production or operating units. The recording of the monthly details in this



FORM 51.—Cost Ledger.



FORM 52.

manner allows an examination and comparison of the expense and the units to be made quickly at any time and puts such information in proper form for ascertaining average costs.

If the accounting and costing is done in one office the totals of columns 3 and 4 of Form No. 50 are used to support the journal entries upon the general ledger. If the costing is done in a separate office, either a complete copy of the Summary of Labor Distribution Sheets, or a Summary of columns 3 and 4 is furnished the Accounting Department.

EXPENSE DISTRIBUTION OF SUPPLIES

The distribution of all supplies is made by the storekeeper, either from supplies stored in the warehouse, or from outside stocks upon properly signed requisitions (Form No. 14) except for fuel oil, which is obtained by measurement of tanks each month, and of timber which is obtained from summary of reports made on Form No. 46, and by Carpenter Foreman, of timber used, which reports are checked against reports of Sawmill and Yard Foreman of timber issued, and balanced against the inventory of sawed timber on hand taken at the end of each month.

The Storekeeper's report of supplies issued for each unit is made on Form No. 16, and the Record of Supplies Issued is kept upon Form No. 18, one sheet for each unit, as explained in General Accounting under heading of Supplies Issued.

Requisitions for supplies issued at the mine originate from four sources; from the Mine Department for underground work; from the Mechanical Department for all repairs and replacements of equipment or construction of new equipment; from the Surface Department for all surface work; and from the Engineering and Assaying Department for engineering and assaying work.

The supplies issued to the Mine Department consist of timber, powder caps and fuse, tools and carbide. The supplies for air drills, pumps, track and mine cars, electric wiring and lights, etc. used underground are issued through the Mechanical Department.

The supplies issued to the Mine Department are reported by each shift boss on Daily Distribution Sheets 46 showing the amount used at each job, the timber being reported as to pieces and sizes in the space provided, and the powder, caps and fuse being copied from the Powder Monkey's Record of explosives issued to each place.

The amount of the timber shown on each Daily Report is converted into board feet by use of a table that adds sufficient percentage for sawing, waste and blocks, and the number of board feet for each class of timber is entered on the proper Monthly Distribution Sheet, 47, together with the number of sticks of powder and number of caps and feet of fuse.

At the end of each month any reasonable discrepancy between timber and explosives as charged to the mine by the Storekeeper and as reported

by Shift Bosses is prorated to the different units before summarizing the sheets.

As it would be impracticable to distribute the tools and carbide used underground to each place, and as the amount of such expense that would be obtained by such distribution would be too small to justify the labor of segregation, the usual practice is to charge the tools to "General Underground," "Tools and Sundries." and the carbide to "General underground," "Lamps and Carbide." This gives the total of such expense for each month which can be better analyzed and watched than if pro-rated.

All other supplies issued through the mechanical and other departments are recorded in detail upon Supplies Issued Sheets 18.

Check of Supply Distributions.—A check of supplies issued is made by comparison of inventory of stocks against the Stock Cards (Form No. 17) each time an inventory is taken of outside stocks, or each time a purchase requisition is placed for supplies of warehouse stocks. Any discrepancy between stock and record of stock should be covered by a requisition obtained from the proper operating head in case of shortage. The matter of overage can be adjusted on charge tickets issued for supplies requisitioned in the future.

As a further check, the signed requisitions Form No. 14 are checked against Supplies Issued Charge Tickets Form No. 16, and then the signed requisitions are returned to each department which issued them.

Summary of Supplies Distributed—A summary of supplies distributed, as shown on Forms No. 47 and No. 18, is made in regular order as to expense and asset accounts and to indirect disbursement accounts upon Form No. 50, in the same manner as shown for Labor. In the "Cost Data" column there is shown for each account the amount of supplies disbursed fron each of the mine stocks as enumerated on Chart of Accounts XIV, subsidiary accounts Nos. 131 to 139 inclusive.

The amount of Handling is pro-rated over the charges, as explained in General Accounting under Supplies Issued.

Posting the Supplies Distributed.—The posting of supplies distributed during the month is made to the Cost Segregation Sheets and Cost Ledger in the same manner as done with the labor distributions. The supplies issued for Expense, Prepaid Expense and Asset Accounts are posted to the proper accounts, while the supplies issued to the indirect accounts are posted to the Shops and Power Accounts.

EXPENSE DISTRIBUTION OF BILLS AUDITED

All bills are audited and paid by the Accounting Department, and to avoid duplication the distribution of the Bills Audited Expense is made by the accounting Department upon the vouchers and entered in the

Bills Audited Record at the same time that the vouchers are entered, as illustrated in General Accounting under Bills Audited.

In small organizations the accounting and costing is preformed by the same force, and it is an advantage to keep the segregation of expense in the Bills Audited Record. Even in large organizations the bills audited expense is handled in the same manner.

Therefore, at the end of each month the detail segregations shown by the Bills Audited Record are summarized in order as to accounts upon Form No. 50 and postings are made to the Cost Ledger, and compilations made to the detail cost sheets in the same manner as done with labor and Supplies.

Summary of Shops Distribution

	Cost Data						General Ledger Accts.	
	Machine	Blacksmith	Carpenter	Saw Mill	Sub-Total	Cost Accts	Debits	Credits
Ore Extraction:—							21851	
General Underground,						20169		
Tools & Sundries	2830	17109	230		20169			
Maint Shaft & Drifts						1182		
Stations,	1182				1182			
Account Receivable						7440		
Denn Ariz Copper Co	7128	162			7290			
Doak	150				150			
Replacements						30036		
Air Line to Pumps	9467				9467			
Drill Sharpener Tools	3208				3208			
Fuse House	723		12218		12941			
Mine Cars	1660				1660			
Steel		158			158			
Sorting Platform			2602		2602			
— Etc —								

FORM 50-A.

EXPENSE DISTRIBUTION OF SHOPS

The summary sheets of Shop Labor, Form No. 49, for each shop having been totalled and balanced, as explained under "Expense Distribution of Labor," the total shop labor for each department and unit account is extended into the "Total Labor" column, and the total of this column is entered at the top of the sheet. To this amount is added the proper proportion of "Overhead Labor" of Foreman, etc., the amount of supplies consumed by each Shop consisting of tools for Machine Shop, coal and oil for Blacksmith Shop, etc., and the amount of Bills Audited Expense, of water, light, etc. Thus the total expense for each Shop is obtained and this total is divided by the total Shop Labor and a factor obtained, which applied to each item in the "Total Labor" column will

give the "Total Expense" to be distributed to each sub-department and sub-department unit account appearing on the summary sheet.

Summary of Shop Distribution.—The summaries of each of the Shop Sheets are then entered upon Form No. 50 in the manner shown by Form No. 50-*A*, and postings are made from the Summary of Shop Distribution to the Cost Ledger and detail cost sheets as with the other expense.

Summary of Repairs Distribution

	Labor	Supplies	Shops	Cost Data	Cost Accounts	General Ledger Accts Debits	General Ledger Accts Credits
Ore Extraction:						23971 7	
Tramming & Tracks:					54453		
Cars		1873	9865	11738			
Underground Tracks	29142		3672	42715			
Station Tending & Caging:					21484		
Chairs	64	701	9629	10394			
Electric Bells		746	3750	1090			
Hoisting:					34025		
General	405	4037	0097	0539			
Cages		2172	20191	22370			
Dinky Hoist			1116	1116			
Top Landing & Tramming:					8008		
Surface Tracks	1320	2733	2647	6715			
Waste Haulage Car			1293	1293			
General Underground:					22622		
Distributing Supplies			283	283			
Water & Lights		5626	14181	19810			
Telephones			2529	2529			
—Etc.—							

FORM 50-*B*.

EXPENSE DISTRIBUTION OF REPAIRS

While the Repairs are shown as a Prepaid Expense, whenever practicable to do so, the Repair Expense should be closed out in the same month that the repair work was done. Some prefer to carry the repairs for one month to be charged out the next, or to be proportioned over several months.

When the repair work is large and covers several months, it is sometimes best to do this, in order to distribute the repair charges evenly over a number of months, as done with replacements. However, as a rule the repair work each month is not large enough to unduly fluctuate the costs and should be closed out in the same month in which the work was done. This method is more popular with the operating force.

Therefore, the amount of each month's labor, supplies and shop charges for repairs are kept separate for each repair job, and summarized upon Form No. 50 in the manner shown by Form No. 50-*B*, making a separate summary for repair charges to Power.

Postings are made in the same manner as the other expense.

EXPENSE DISTRIBUTION OF REPLACEMENTS

The Replacements consist of labor, supplies and shop charges for the replacement of minor and major equipment, of mine cars and other haulage equipment, hoist cables, sheave wheels, air drills, steel, retubing boilers, and other mine, mill and smelter equipment, the life of which is less than the average life used for all equipment in setting aside depreciation reserve, or is for equipment made necessary to maintain the normal output because of increased length of haul or depth or workings, as allowed by Article 222 of Treasury Department's Regulations No. 45.

Such charges each month are made direct to Replacement Accounts which are cleared by charges to operating expense accounts the following month for minor charges and pro-rated over several months for major items.

Some mines include their replacement charges in the labor and supplies charged direct to expense accounts. However, to do this results in wide fluctuations in the labor and supply expense from month to month, and in confusion to those in charge of operations, as well as burying the replacement expense. Also such procedure makes it difficult to analyze the operating labor and supply costs and leads to indifference on the part of the operating heads to large fluctuations in costs, which are attributed to replacement charges having been included and the matter dismissed without further consideration.

The replacement expense should be kept separate from the regular operating expense in order that it may be known whether or not it would be more profitable to discard the present equipment entirely for something better, or whether the equipment is being abused. Also, by segregating the replacement charges from the direct operating expense any fluctuations in the latter creates an interest as to the reason therefor which can be quickly ascertained from the detail statements of cost and production.

The replacement charges on the books the first of each month are analyzed and the total of minor charges and the proper proportion of major charges are summarized upon Form No. 50 and postings made to the Cost Ledger and detail cost sheets in the same manner as done with the other expense.

EXPENSE DISTRIBUTION OF POWER

The detail of the Power Expense as shown upon the General Ledger is recorded upon the Cost Ledger for each power unit of Boilers, Air Compressors, Air Drills, etc., and distribution of the expense of each is made separately.

Boilers.—The distribution of the expense of the Boilers or Steam Plant is made according to the amount of steam furnished the different units of equipment such as, compressors, hoist, pumps, etc., and as used for heating. This distribution is furnished at the end of each month usually by the Mechanical Department.

Air Compressors.—The expense of the Air Compressors is distributed according to the air consumed by the several operating units, such as air drills, pumps, etc., as reported by the Mechanical Department each month.

Air Drills.—The Air Drill expense is composed of upkeep of each drill, air lines, hose and fittings and general expense of new steel, sharpening old steel, wrenches, etc. This expense is distributed to the cost accounts according to the hours air used, which are reported on Form No. 46. Each shifter keeps a list of the machines on his run, giving the make and shop number, and he reports each day the number of hours each machine used air. The shop number on each machine is according to the amount of air capacity. The amount of air hours for each place is entered on Form No. 47 for each place and the amount of air hours each machine was operated is again entered each day opposite the name of the machine on the Air Drill Record using Form No. 49.

At the end of each month the air hours compiled on Forms No. 47 for all accounts are totalled and the amount divided into the total Air Drill Expense, and the rate per hour thus obtained is applied to the total hours for each account and the amount of the Air Drill Expense for each account is obtained.

Electric Plant.—The total amount of Electric Plant Expense is distributed by dividing the total kilowatt hours of electricity consumed by all the different units of the plant as shown by meter readings into the Electric Plant Expense, and the cost per kilowatt hour thus obtained is used to distribute the expense to each unit according to the amount of electricity consumed.

Summary of Power Distribution.—The detail of the Power Expense is made on Forms No. 50 in the following order:

1. Boilers,
2. Compressors,
3. Air Drills.

The distribution of the Boiler or Steam Plant Expense is made first, the Compressor Expense is distributed second, and the Air Drill

Expense last. This is necessary on account of the boilers furnishing steam to the compressors and the compressors furnishing air to the air drills.

A summary is then made of the charges to the cost accounts in the same manner as illustrated on Form No. 50-*A*, for Shops, and postings are made of the details to the segregated cost sheets for Power Accounts, and of the summary totals to the Cost Ledger.

DISTRIBUTION OF SUSPENSE ITEMS, ETC.

In order that the cost record may be complete and fully support the general accounting records, it is necessary to make up on Form No. 50 a monthly summary of the distribution of Suspense Items, Accrued Expense, and Miscellaneous Operating Charges and Credits, to the departmental expense and asset accounts, as illustrated in General Accounting under "Distribution of Accrued Disbursements," and "Miscellaneous Charges and Credits."

All the elements of expense having been distributed to the cost accounts, it is next in order to determine the development overhead expense and to distribute the departmental overhead expense, if the pro-rated method of cost determination is used.

DETERMINING THE DEVELOPMENT OVERHEAD

The expense of mining divides itself into two general divisions of Exploration and Development and of Ore Extraction. The Exploration and Development Expense prior to a mine becoming a producer is all of the expense at the mine and is charged to Property Account and is pro-rated when production has commenced to production through the depletion charge. However, after the mine has reached the production stage, it is customary to include the exploration and development expense incidental to maintaining and enlarging the known ore reserves as part of the cost of mining, especially that part of the development work that is carried on by the same force and organization as look after the Ore Extraction.

Theoretically a certain proportion of the expense of each of the sub-departments of Ore Extraction, except Stoping, is chargeable to Exploration and Development, and whenever the Development Expense is being charged to Property Account, the correct proportion of the expense of Tramming and Tracks, Station Tending and Caging, Hoisting, etc., should be determined and the sub-departments of Ore Extraction credited and "Exploration and Development, Development Overhead," should be charged.

There are several methods of determining what shall be charged to Development. One is to divide the total shifts of development work

by the total shifts of work in the mine, and apply the factor so obtained to the expense of each of the sub-departments of Ore Extraction, except Stoping, and to credit each sub-department and charge Development Overhead with the amounts so obtained. Another method is to obtain the factor to be used by dividing the total cars of ore and waste into the cars of waste. Still another method is to keep the expense of each sub-department segregated into expense for development and expense for ore extraction whenever possible, such as tramming and tracks, etc., and to pro-rate the expense of those sub-departments that cannot be so segregated.

While it is theoretically correct to do this, even when the total Exploration and Development Expense is being charged against current production, so to do does not change the total mining costs, but simply decreases the Ore Extraction Expense and increases the Exploration and Development Expense a like amount.

There is really nothing gained in determining the development overhead when the total of the Exploration and Development Expense is being charged to current production. The labor and expense involved in making the segregations to determine Development Overhead, the complication of the costs to the operating man, and the delay in obtaining the costs, more than offsets any theoretical value attached to the determining of this Overhead charge. At best it is only an averaged charge and many times part of the charge is fictitious as certain of the expense would go on even though there were no development work. However, the pro-rating of the expense between Development and Ore Extraction is a fixed part of the cost procedure of some of the larger mines who will probably continue the method, until they are convinced that the cost of making the change will be more than offset by the benefits.

DISTRIBUTING THE OVERHEAD EXPENSE

The Overhead Expense of mining consists of:
Departmental Overhead, and
General Overhead.

When the mine is producing only one principal product, there is no need to distribute any of the overhead expense, either departmental or general. However, when there are two or more separate products which are produced and sold separately, it is then necessary to distribute the overhead expense. This is best done at the mine on a tonnage basis.

It is the practice of some mines to classify the expense of each department into direct or productive accounts and indirect or non-productive accounts, and then to distribute the expense of the indirect or non-productive accounts over the direct or productive accounts.

This results in additional segregation expense, complication of the

costs and delays the time in which the cost data can be delivered to the operating heads. There is no real benefit obtained from this prorating of the indirect departmental expense, as the total department expense is the same in both cases. However, this method is popular with some mines, and having become established and the operating heads having become familiar with the costs so presented, the method will probably be continued.

COST FACTORS

The factors used in obtaining mining costs consist of:

1. Production Factors, and
2. Operating Factors,

which must be carefully compiled, if accurate costs are to be obtained.

Production Factors.—The production factors are three in number, as follows:

1. Ton of Ore Mined and Treated,
2. Pound of Refined Base Metals,
3. Ounce of Refined Precious Metals.

The production factors are used in obtaining the Profit and Loss Cost. That is, to determine whether or not the business as a whole, or any department, is operating at a profit or a loss. The ton cost is also used for some departments as an efficiency cost. As a rule, however, the operating factors will give a better efficiency cost than the tonnage cost.

Compiling the Tonnage Factors.—Copy of the daily assay reports of contents of ores mined as shown by Form No. 19 is furnished the Cost Department, and the number of cars of ore shown thereon from each place is compiled on Underground Distribution Sheets (Form No. 47). The actual weight of ore shipped each month plus the estimated weight of ore in bins the last of month, less weight of ore in bins the first of month, is divided by the number of cars of ore mined. The factor so obtained is applied to the total cars from each place and the total tons thereby obtained. If ores of different weight and character are mined their weight is determined separately, and the proper factor is applied to the cars obtained from each place. A similar method is followed in obtaining the tonnage of ores milled and smelted. For ores transported, the actual weights of course are taken. As a check upon these weights the ore as taken from each stope in mine cars should be weighed once each six months.

Summary of Tonnage Factors.—The tonnages for the different departments having been ascertained, a summary for use in costing and of taking up the production in process and on hand upon the books, is made as follows:

SUMMARY OF ORE TONNAGES

YEAR—1918

	Lead Ores, Tons		Copper Ores, Tons	
	Wet	Dry	Wet	Dry
In Bins 1–1–18	50.000	48.610	353.000	326.702
From Second Class Dump			108.140	104.928
Stoped (Less Second Class)	28,356.000	27,690,854	93,617.000	86,503.764
From Development and Repairs	1,637.060	1,586,172	7,970.910	7,358.297
Totals	30,043.060	29,325.636	102,049.050	94,293.691
Remaining in Bins 12–31–18	224.000	219.520	322.000	298.526
Shipped (Lead Estimated)	29,819.060	29,106.116	101,727.050	93,995.165
At Smelter and in Process 1–1–18	248.830	242.380	358.500	328.924
	30,067.890	29,348.496	102,085.550	94,324.089
Smelted and Treated	29,244.230	28,549.546	101,834.960	94,091.667
At Smelter 12–31–18	823.660	798.950	250.590	232.422
At Mill and On Track	668.000	647.960		
In Process	50.000	48.500		
At Smelter 12–31–18	48.000	46.608		
Hand Sorted	57.660	55.882		

Summary of Final Production Factors.—Generally the tonnage factors are used for departmental costs of mining, milling, smelting and transportation, and sometimes as in the case of iron ore and coal, the ton factor is the final cost factor. However, in the case of metals other than coal and iron *et al*, the final production factor is the pound for base metals and ounce for precious metals. Therefore, in the case of metal mines, the recoverable contents of each ton of ore must be obtained. In the case of base metal mines, the precious metal by-products are treated as a credit, while in precious metal mines, the base metal by-products are treated as credits.

The time of determinating the final production factor is a matter that must be settled first. In the case of those mines that smelt and refine their products, if the final production factor is not determined until the refined metal is produced, the final cost will be obtained from 3 to 4 months after the ore is produced, and only that portion of the expense applicable to the refined metal produced can be used, the remainder being held in suspense. This delay in obtaining final costs and the complicated bookkeeping involved is not desirable. Therefore, it has become the practice to treat the smelting and refining as separate departments and to make a flat or sliding scale charge both for smelting and refining and to agree upon fixed deductions for smelter and refinery losses, so that the final production factors for costs and credits can be determined as soon as the ores or concentrates have been sampled by the smelter, and assay contents thereof have been agreed upon.

This enables the final production factors for costs and credits to be determined and the final cost to be obtained at the end of each month,

leaving only that portion of ore and concentrates in suspense that has not been sampled by the smelter.

Each month as the shipments to the smelter are sampled and assays agreed upon the final production factors are determined and complied upon Form No. 26 for principal production and upon Form No. 29 for secondary production and summaries of production factors for costs and credits are made up, as follows:

ANALYSIS OF ORES SAMPLED FOR SMELTING
PRINCIPAL PRODUCTION

Grade	Tonnage			Rec'y Contents Per Dry Ton		
	Wet	Per cent Moisture	Dry	Ounces Silver	Ounces Gold	Per cent Copper
Oxide	98,852.97	7.76	91,181.034	1.160	0.0127	4.07
Hi-Grade	2,891.77	2.43	2,821.450	19.154	0.0205	28.98
Hi-Grade Special	90.22	1.15	89.183	15.96	0.0351	15.30
Totals	101,834.96	7.60	94,091.667	1.714	0.0130	4.83

RECOVERIES FROM ORES SAMPLED AND SMELTING
PRINCIPAL PRODUCTION

	Per Wet Ton	Per Dry Ton	Total
Gold	0.0120	0.0130	1,220.12 oz.
Silver	1.5832	1.7135	161,230.00 oz.
Copper	89.1800 lb.	96.5200 lb.	9,081,959.00 lb.
	4.4600 per cent	4.8300 per cent	

ANALYSIS OF PRODUCTION CREDITS
PRINCIPAL PRODUCTION

	Per Dry Ton	Per Pound Copper	Total
1,220.12 oz. Gold at $20.00	0.2594	0.00269	24,402.40
161,230.00 oz. Silver at 0.9778 cts	1.6755	0.01736	157,647.29
Refunds and Discounts, Etc	0.0529	0.00055	5,126.89
	1.9878	0.02060	187,171.58

SUMMARY OF ORE AND CONCENTRATES SMELTED
SECONDARY PRODUCTION

	Per cent Moisture	Dry Tons	Recovery Contents Per Dry Ton				
			Ounces		Per cent		
			Gold	Silver	Lead	Iron Lime	Insolubles
Mill Concentrates	11.10	2,926.06	0.2426	22.76	32.06	17.14	22.33
Ore Shipments	2.65	1,213.30	0.1086	5.03	21.15	18.25	36.93

RECOVERIES FROM ORES AND CONCENTRATES SMELTED
SECONDARY PRODUCTION

	Ounces		Pounds	
	Gold	Silver	Lead	Copper
Mill Concentrates	709.47	66,592.0	1,876,240	480[1]
Sorted Lead Ore	7.73	606.0	31,186	
Sorted Lead-Copper Ore	3.16	1,423.0		27,290[1]
Mill Production	720.36	68,621.0	1,907,426	27,770[1]
Direct Shipments	131.60	6,103.0	513,264	
Total Production	851.96	74,724.0	2,420,690	27,770[1]

[1] Credited to Lead and included in Principal Production of Copper.

ANALYSIS OF PRODUCTION CREDITS
YEAR—1918
SECONDARY PRODUCTION

	Pounds Lead	Per Pound Lead	Total
Gold, 709.47 oz		0.00744	$ 14,189.02
Silver, 66,592 oz		0.03527	67,277.31
Sorted Lead Ore		0.00333	6,356.09
Total Mill Credits	1,907,426	0.04604	$ 87,822.42
Direct Ore Shipments, Net	513,264		20,423.07
Total Credits	2,420,690	0.04471	$108,245.49

OPERATING FACTORS

As a rule there is a certain factor of production, consumption or operating movement for each unit of operation or equipment that is the correct unit of measurement of efficiency and cost, as, for instance, for:

Drifting, Raising and Sinking	The feet advanced.
Stoping	The tons broken.
Tramming	Cars per 1,000 feet.
Hoisting	Cars hoisted.
Top Landing	Cars landed.
Pumping	Gallons pumped.
Assaying	Assay units determined.
Supervision	Shifts supervised.
Boilers	Gallons water evaporated. Barrels oil consumed.
Air Drills	Air hours.

etc.

These operating units should be carefully compiled and recorded in the spaces provided therefor on Form No. 52. As a rule operating information of more value can be obtained from the efficiency statements worked up on these units than can be gotten from the cost statements. For instances, the feet advanced per man shift in drifts, raises, etc., gives more valuable information to the operating man than cost per foot, especially when accompanied with statements of timber and of powder per foot advanced.

The increase or decrease in wages, or cost of supplies, will fluctuate the cost per foot and is something over which the foreman or boss has no control. However, the advance per shift and the powder and timber per foot are matters for which the supervisor is responsible, and are units of measurement which he can understand and utilize.

Standardization in the determinations of operating units and the compiling of the expense and operating data in a uniform manner by all mines would result in great benefit to the mining industry in establishing standards of achievement and educating supervisors as to what are standard results.

TIME

The remaining principle to be considered in compiling cost data is Time. There must be decided not only what costs shall be kept, but also what periods of time each cost shall cover. It is best so to compile the cost data that costs may be readily taken from the records for each month, for the year to date and for each year with the least possible effort. Also, where there are wide fluctuations in certain costs from day to day, or where it is necessary to have the cost each day or each week in order to maintain the efficiency, the cost data should be compiled so that daily and weekly costs can be obtained with least lost of time, expense and effort.

I am inclined to the opinion that monthly costs, if obtained within a few days after the close of each month, are sufficient in all cases, and that daily statement of production units per man shift, etc, give all information necessary to maintain efficiency and are of more value than daily costs which can never be complete nor accurate except for labor and supplies, and in numerous cases not even accurate for these two items.

CHAPTER XXIII

COMPILING THE COSTS

Having established a Chart of Cost Accounts to conform to the Units of the Organization and distributed the Elements of Expense thereto, and having compiled the Production and Operating Factors, for the periods of time in which costs are to be determined, it is then possible to compile the costs in as detail a matter as desired.

KINDS OF COSTS

The Costs that are usually compiled by mines consist of six groups as illustrated by Chart XV, as follows:

1. Total Production Costs,
2. Departmental Production Costs,
3. Departmental Unit Costs,
4. Shops and Power Costs,
5. Prepaid Costs,
6. Asset Costs.

Of course, there are the Estimated Costs made by the Engineering and Mechanical Departments of proposed construction, etc. However, such estimated costs are not entered upon the accounting records, but are used by the manager and directors when deciding whether or not certain work shall be done. When new work is to be done, the bills of material accompanying these estimated costs are used by the Purchasing Department in placing orders for materials.

Production Costs.—The Production Costs consist of:

Total and Net Products Costs, and

Departmental Production Costs.

The total Production Cost is the total cost without consideration of credits for by-products, refunds and discounts and miscellaneous administrative and operating production earnings.

The Net Production Cost is the total cost less the credits. The Departmental Production Cost is the production cost for each department of administration and operation.

Total and Net Production Costs.—As each month's results are determined by the Operating Department, a complete statement of accounts, showing total production costs and credits, etc., as well as production is forwarded to the Administrative Department. Upon

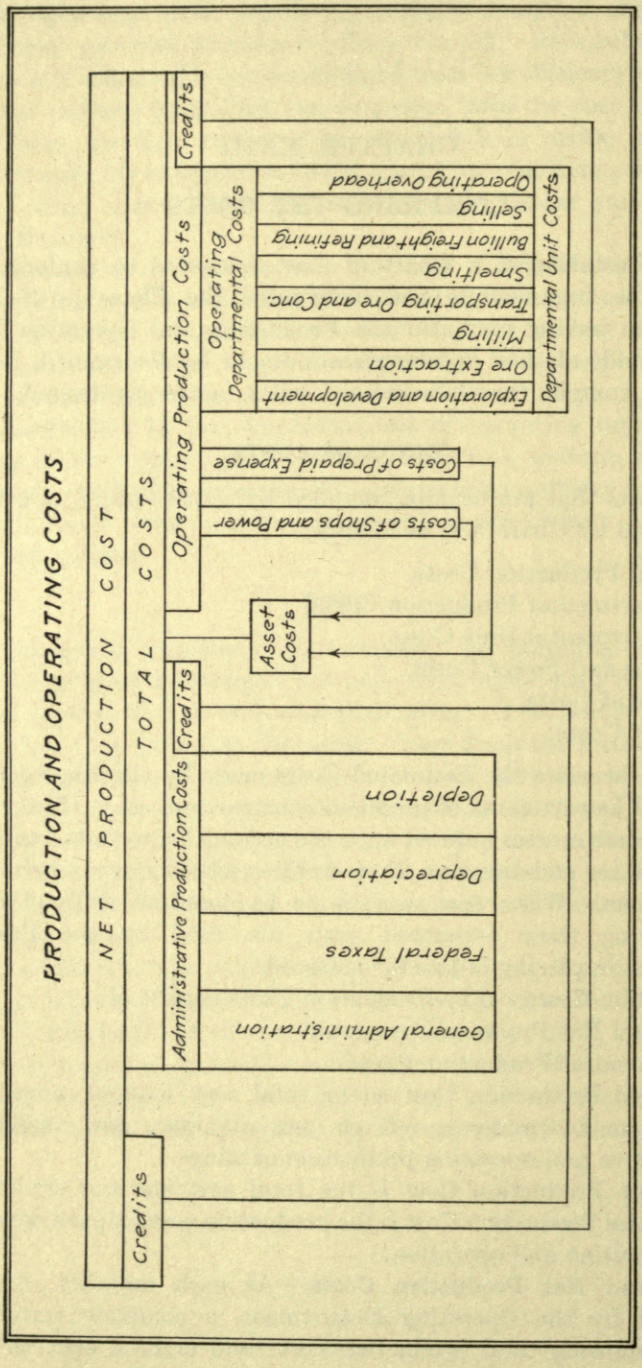

PRODUCTION AND OPERATING COSTS
NET PRODUCTION COST
TOTAL COSTS
Credits
Administrative Production Costs
General Administration
Federal Taxes
Depreciation
Depletion
Credits
Operating Production Costs
Operating Departmental Costs
Exploration and Development
Ore Extraction
Milling
Transporting Ore and Conc.
Smelting
Bullion Freight and Refining
Selling
Operating Overhead
Departmental Unit Costs
Asset Costs
Costs of Shops and Power
Costs of Prepaid Expense
Credits

CHART XV.

receipt of this statement the Administrative Books have been closed for the month and a total and net production cost can be obtained. However, as the accrued federal taxes are usually determined and taken up on the Administrative Books only at the end of each quarter and at the close of the year, the total and net production costs are generally determined only at the end of the quarterly and yearly periods.

As soon as the Operating Books are closed at the end of each year, and before all the costs are determined, a statement of operating accounts and of production is forwarded to the Administrative Department and this statement of operating accounts is taken up on the administrative records and the Income Account and Balance Sheet is made out, as explained under Administrative Accounting.

As a complete statement of accounts is then in possession of the Administrative Department showing the total production charges and credits a statement of total and net production costs for the year can be obtained before the detail operating costs are received.

To obtain the total costs when there is only one product produced a statement of the total charges, as shown by the Income Account, is made up and divided by the total production units, and to obtain the net production cost the amount of the credits is subtracted from the total charges and the remainder divided by the total production units.

When there is a secondary production as well as a principal production, or more than one product produced, the total amount of the administrative charges must be pro-rated to each product, as shown by a statement of charges taken from the Administrative Books, as follows:

	Principal Production	Secondary Production	Total Expense
Operating Expense	$1,516,189.88	$250,882.50	$1,767,072.38
Administrative Expense	83,801.64		83,801.64
Federal Taxes	38,410.67		38,410.67
Depreciation of Equipment	18,000.00	18,474.50	36,474.50
Depletion of Mine Investment	176,614.62	6,102.46	182,717.08
Total	$1,833,016.81	$275,459.46	$2,108,476.27

By reference to the Individual Operating Profit and Loss Statements for Copper and Lead which support the Combined Operating Profit and Loss Statement as illustrated on page 147, it is found that there was a loss of $12,064.21 on the secondary production of lead. Therefore as there was no income from the lead production, all of the federal taxes are charged to copper production. As there were no funds from lead turned over to the Administrative Department, and no service performed by the latter department for the lead production, all of the general administrative expense is charged to copper. Of course, when the secondary production shows a profit, the proper amount of federal taxes and of administrative expense will be pro-rated to it according to the

percentage that the secondary income is to the total income. However, the proper proportion of depreciation and depletion of investment is distributed each to the principal and to secondary production.

When the depletion charge is based upon Discovery Value or Value as of March 1st, 1913, which is in excess of investment value, only the amount representing the depletion of investment should be used to get the cost of depletion.

Referring to the operating production records of the principal and secondary products and credits summaries of which are shown on pages 212 and 213, and copies of which have been furnished the Administrative Department, we find that the total production factors are, as follows:

	Pounds Copper	Pounds Lead
Principal Product	9,081,959	
Secondary Product		2,420,690

and that the total operating credits, are:

For Principal Production	$187,171.58
For Secondary Production	108,245.49

By reference to the Administrative Ledger, we find that the only administrative credit is Interest on Bank Deposits amounting to $23,051.55, all of which is applicable to the principal production, as the secondary production had no funds on which to collect interest. Therefore by summarizing the operating and administrative expense and credits that have been ascertained, from the Administrative Books and Operating Reports and applying the production factors thereto, there is obtained Total and Net Production Costs for both Principal and Secondary Production, as follows:

TOTAL AND NET PRODUCTION COSTS

YEAR—1918

	Per Pound of Principal Product		Per Pound of Secondary Product	
	Total	Per Pound	Total	Per Pound
Operating Expense	$1,516,189.88	$0.16695	$250,882.50	$0.10364
Administrative Expense	316,826.93	0.03488	24,576.96	0.01015
Total	1,833,016.81	0.20183	275,459.46	0.11379
Operating Credits	187,171.58	0.02061	108,245.49	0.04472
Administrative Credits	23,051.55	0.00254		
Total Credits	210,223.13	0.02315	108,245.49	0.04472
Net Total	$1,622,793.68	$0.17868	$167,213.97	$0.06907
Total Production	9,081,959.00		2,420,690.0	
Pounds Per Ton Ore	96.52		423.0	
Pounds per Ton Concentrates			641.2	

When both the Operating and Administrative Records are kept by the same force, the total and net production costs are obtained at the same time as the detail operating costs. However, when there is a separate Administrative Department the total costs are ascertained by the Administrative Department.

This total and net production cost is furnished the directors and officers as soon as possible after the close of each period and is a concise statement that can be easily compared with past results to locate any fluctuations either in the operating or administrative expense and cost. In order that it may be readily seen whether increases or decreases in cost are due to increase or decrease in expense, in total production, or in recovery per ton, a summary of production and recovery is shown below the statement of costs.

Such a simple statement of costs can be easily remembered and is of great value when used for comparison with market price of metal, and for reference in determining policy of production operations and dividend disbursements, etc.

However, to thoroughly understand fluctuations in the operating and administrative costs it is necessary to have statements of greater detail than the statement of Total and Net Production Costs.

PRODUCTION DIVISION COSTS

It is necessary to obtain separate costs of each division of adninistration and operation for each period for comparison with previous periods, so as to know in what department any increase or decrease occurred, and the reason therefor.

The production division Costs consist of two groups to correspond with the two divisions of

Administration, and
Operation,

as shown by Chart XI, as well as Chart XIII.

Administrative Production Costs.—The expense of each of the departments of administration is kept in the General Administrative Ledger and not in the Cost Ledger, which usually is confined to recording the expense of the Operating Departments, Sub-departments, etc., unless both the Administrative and Operating Records are kept by the same force, when the expense of Administration may be recorded in the Cost Ledger.

To obtain the Administrative Departmental Costs, the total expense of each department, and the credits, are compiled and distributed to the principal and to the secondary production, if any, as illustrated under Total and Net Production Cost, and the total of the production units is

then divided into the amount of expense of each department and into the amount of the credits as shown by the following statements:

TOTAL ADMINISTRATIVE PRODUCTION COST OF PRINCIPAL PRODUCTION OF 9,081,959 LB. OF COPPER—YEAR 1918

DEPARTMENT ACCOUNT	COST PER POUND COPPER	TOTAL EXPENSE
General Administration	$0.00923	$ 83,801.64
Federal Taxes	0.00423	38,410.67
Depreciation of Equipment	0.00198	18,000.00
Depletion of Mine Investment	0.01945	176,614.62
Total Administration	$0.03489	$316,826.93
Credits		
Interest on Bank Deposits	$0.00254	$ 23,051.55
Net Total Administration	$0.03235	$293,775.38

TOTAL ADMINISTRATIVE PRODUCTION COST OF 2,420,690 LB. OF SECONDARY PRODUCTION OF LEAD—YEAR 1918

ACCOUNT	COST PER POUND LEAD	TOTAL EXPENSE
General Administration		$ 0.00
Federal Taxes		0.00
Depreciation of Equipment	$0.00763	18,474.50
Depletion of Mine Investment	0.00252	6,102.46
	$0.01015	$24,576.96

The Administrative Expense consists of fixed charges, except "General Administration," and only the latter account is analyzed any further than shown by the above statements.

There should accompany the statement of Administrative Production Costs, the detail of General Administrative Expense. It is not necessary to detail the other charges, except that in the report transmitting the statement of costs, there should be stated the rate of charge for depreciation and depletion, and what amount of the Federal taxes is for Income, Excess Profits, Capital Tax, etc.

Operating Production Costs.—The Operating Departmental Production Costs are the costs of production for each department. These costs are summarized in concise form for the use principally of the manager, and are determined upon the final production unit of pound or ounce of metal and per ton of ore.

To obtain the Operating Departmental Production Costs, the amount of the expense for each department, is taken from the Cost Ledger, and the amount of the credits is taken from the production records for both the principal and secondary production, if any, and these are divided by the amount of the production, and statements of costs per pound and per ton are made up, as shown by the following forms:

TOTAL OPERATING PRODUCTION COSTS PER POUND OF PRINCIPAL PRODUCT,—YEAR 1918

Number of Men	Department Account	Cost per Pound Copper	Total Expense
47	Exploration and Development...0.01877		$ 170,497.08
298	Ore Extraction.....0.06280	$0.08157	570,355.09
12	Ore Transportation	0.00444	40,348.49
11	Operating Overhead	0.01937	175,868.36
1	Smelting	0.03652	331,664.74
	Bullion Freight and Refining	0.02203	200,082.26
	Selling	0.00301	27,373.86
369	Total Operating	$0.16694	$1,516,189.88
	Credits:		
	Gold and Silver, By-products	$0.02005	$ 182.049.69
	Refunds and Discounts, etc	0.00055	5,121.89
	Total Credits	$0.02060	$ 187,171.58
	Net Operating	$0.14634	$1,329,018.30

TOTAL OPERATING PRODUCTION COSTS PER POUND OF SECONDARY PRODUCT,—YEAR 1918

Account	Pounds Lead Produced	Cost Per Pound Lead	Total Expense
Lead Mill Production		$0.09741	$182,752.84
Lead Concentrates Smelting		0.01022	19,169.09
Lead Concentrates Freight		0.00811	15,228.13
Lead Bullion Refining and Selling		0.01500	28,143.60
Milled Lead Operating Total	1,876,240	$0.13074	$245,293.66
Mill Production Credits:			
Gold and Silver, By-products		$0.04271	$ 81,466.33
Sorted Ores	31,186	0.00333	6,356.09
Total		$0.04604	$ 87,822.42
Milled Lead Operating, Net	1,907,426	$0.08470	$157,471.24
Credit, Net Direct Shipments	513,264		20,423.07
Lead Operating, Net	2,420,690	$0.05662	$137,048.17

OPERATING PRODUCTION COSTS PER TON

Tons	Account	Cost per Wet Ton	Cost per Dry Ton	Total Expense
	Exploration and Development	$1.3979	$1.4930	$170,497.08
	Ore Extraction	5.8781	6.2782	716,939.22
121,969	Total Per Wet Ton Stoped	7.2760		
114,195	Total Per Dry Ton Stoped		$7.7712	$887,436.30
27,691	Dry Tons Lead Ore Credits		5.2936	146,584.13
86,504	Net Per Dry Ton Copper Ore Stoped		$8.5644	$740,852.17
	Ore Transportation:			
	Tramway Expense		0.4370	40,348.49
93,995	Per Dry Ton Copper Shipped	0.1579		
	Ore Freight:			
94,092	Per Dry Ton Copper Smelted	0.2791		
	Smelting Expense		3.5249	331,664.74
	Operating Overhead		1.8691	175,868.36
			$14.3954	$1,288,733.76

DETAILS OF LEAD MILL PRODUCTION COST

YEAR—1918

LEAD ORE PRODUCTION

WET TONS				TOTAL
29,993	Stoped and Developed Ore			$146,584.13
299	On Hand and at Smelter 1–1–18			
	Making			
30,292	Tons an average of	@4.8390	Mining	$146,584.13
	of which			
30,118	Tons were shipped	@0.1644	Tramway	4,950.99
30,292	Tons Mined, etc., Average	5.0025		$151,535.12
	of which			
1,294	Tons were shipped direct to Smelter	@4.3051		5,570.84
	Leaving			
28,998	Tons at Average of	5.0336		$145,964.28
	of which			
28,823	Tons Shipped to Mill	@0.1192	Ore Freight	3,436.98
	Making a total of			
28,998	Tons Mined, etc., Average	@5.1521		$149,401.26
	of which			
28,106	Tons went to Mill	5.1521		144,864.35
892	Tons on Hand 12–31–18	@5.0862		$ 4,536.91
	393.000 At Mill			
	275.000 On Track			
	224.000 At Mine			

LEAD ORE IN PROCESS

WET TONS		COST PER WET TON		TOTAL
28,106	Tons Delivered to Mill.....	@$5.1521		$144,864.35
	Milling Expense Treating 27,851			
	Wet Tons or 27,336 Dry Tons....	@ 3.4306		93,778.47
28,106	Tons to Mill in 1918.....	@ 8.4908		$238,642.82
	of which			
	27,851 Tons were Concentrated..	@ 8.4962	$236,626.88	
	93 Tons Hand-Sorted Lead Ore Smelted...	@$7.7444	$720.23	
	54 Tons Hand-Sorted Copper Ore Smelted..	@$7.9996	431.98	$ 1,152.21
	Making a Total of			
27,998	Tons Concentrated and Smelted..	@ 8.4927		237,779.09
	Leaving			
108	Tons in Process 12–31–18.....	@ 7.9996		$ 863.73
	50 Tons in Mill			
	58 Tons Hand Sorted Ore at Mill			

LEAD CONCENTRATES

DRY TONS		COST PER TON	TOTAL
3,929.710	Tons Concentrates Produced from 27,851 Wet Tons Milled in 1918.....	@$60.2148	$236,626.88
2,926.060	Tons Smelted During Year.....	@ 62.4570	182,752.84
1,003.650	Tons on Hand 12–31–18.....	@ 53.6781	$ 53,874.04
	934.205 At Smelter		
	69.445 At Mill		

Fluctuations in the cost per pound may be due to fluctuations in the expense or they may be due to fluctuations in the recovery per ton. Therefore by consulting the cost per ton along with the cost per pound as well as the production statements of recoveries of products and by-products, the cause of the fluctuations, if any, can be quickly ascertained.

The tonnage costs for secondary product illustrate the indirect method of obtaining production costs as mentioned in "Operating Accounting" under Production.

Departmental Production Costs.—While the Operating Production Costs per pound and per ton along with the production reports as illlustrated under Production Factors, will enable the Manager to locate the fluctuations and the cause therefore, they are not in sufficient detail to be of much benefit to the department heads to whom the Manager looks for results and explanations.

Therefore, it is necessary to furnish each department head with a statement showing the costs based upon the production of his department for each sub-department and for each element of expense as compiled in the Cost Ledger.

Such an analyzed statement is furnsihed the head of each department of Mining, Milling, Smelting, etc., as shown by the Statement of Costs for the Mining Department, as shown by form on page 226.

Upon the receipt each month of such a statement of costs, the head of each department can quickly compare the costs with the previous month or months, and ascertain in what sub-departments there were increases or decreases, and in what elements of expense the increases or decreases occurred. Also, by comparing the production statements with previous months it can be seen whether or not there were any fluctuations in production and what was the result in the costs.

While these departmental production costs enable each department head to readily ascertain all fluctuations in his department and to locate the source of any fluctuation, they do not give sufficient detail to inform him as to what is the item of expense that caused the fluctuation. To obtain such information, it is necessary to detail the expense of each sub-department, and in order to make the details of the sub-departments of value to the supervisors of these departments, the proper production or operating unit for each department is compiled and the unit cost for each sub-department shown as explained under Departmental Unit Costs.

DEPARTMENTAL UNIT COSTS

It is possible for the expense of some of the sub-departments to fluctuate from month to month regardless of the amount of the production of the department, on which costs have been determined and without any change in efficiency, wages or costs of supplies, etc. For instance the production cost of Exploration and Development may either increase or decrease when there has been the same rate of mine production, and the same efficiency in development work, due to more or less development work done. The same may occur with Pumping due to increase or decrease in flow of water, and to Maintenance of Shafts and Drifts, as a result of more or less work done, and to Supervision as a result of vacations, as well as to Stoping as a result of increase or decrease in amount of shipping ore encountered in development, etc.

Therefore, it is necessary to determine the costs for the sub-departments upon the production or operating unit applicable to each department, such as per foot advanced in Sinking, Drifting, Raising, etc., per wet ton stoped for Stoping; per car of ore and waste for Tramming, Station Tending and Caging and for Top Landing; per thousand gallons of water pumped for pumping, etc. Thus the proper cost is obtained for each supervisor, and the efficiency of each sub-department, or unit is ascertained.

To obtain the departmental unit costs, the detail of the expense for each sub-department is taken from Form No. 50, and the total production or operating units for each sub-department is divided into the amount of

the departmental expense, and detail statements of sub-departmental costs and expense made up, as follows:

DETAILS OF EXPLORATION AND DEVELOPMENT EXPENSE

Drifting: 960 feet @ $9.7235.....			$9,237.35
Labor.....		$4,896.31	
448⅝ Miners @$5.35...	$2,400.14		
447¼ Muckers @ 5.10...	2,280.97		
14 Timbermen @ 5.60...	78.40		
Footage Bonus.....	136.80		
Supplies.....		2,709.49	
Explosives.....	$2,568.04		
Timber.....	141.45		
Air Drills.....		1,631.55	
Feet advanced per man shift 1.0441.			
Raising: 308 feet @ 12.8087			3,945.07
Labor.....		$1,758.22	
176 Miners @ 5.35.....	$941.60		
62¾ Muckers @ 5.10.....	302.02		
69¾ Timbermen @ 5.60.....	390.60		
Footage Bonus.....	106.00		
Supplies.....		1,539.92	
Explosives.....	$622.92		
Timber.....	917.00		
Air Drills.....		646.93	
Feet advanced per man shift 0.999.			
Total Exploration and Development Expense.....			$13,182.42

DETAILS OF ORE EXTRACTION EXPENSE

Stoping: 9,366 Wet Tons @ $3.3428 per ton..			$31,309.06
Labor.....		$22,324.20	
1,768⅛ Miners @$5.35.....	$ 9,459.47		
2,183¾ Muckers @ 5.10.....	11,137.13		
308½ Timbermen @ 5.60.....	1,727.60		
Supplies.....		5,544.39	
Explosives.....	$ 2,054.87		
Timber.....	3,489.52		
Air Drills.....		3,440.47	
Tons stoped per man shift 2.198.			

etc.

ANALYZED MINING COSTS PER WET TON FOR EACH SUB-DEPARTMENT AND EACH ELEMENT OF EXPENSE FOR YEAR—1918

Account	Total Expense	Cost per Dry Ton	Cost per Wet Ton Stoped for 121,969 Wet Tons						
			Labor	Supplies	Power	Shops and Repairs	Replacements	Sundry Expense	Cost per Wet Ton
Stoping	$375,576.81	$3.2889	$2.1257	$0.6150	$0.3385				$3.0792
Tramming and Tracks	62,928.54	0.5423	0.4448	0.0285		$0.0343	$0.0001		0.5077
Station Tending and Caging	14,403.55	0.1261	0.1078	0.0012		0.0092			0.1182
Hoisting	51,712.95	0.4529	0.1179	0.0072	0.2613	0.0310	0.0066		0.4240
Top Landing and Tramming	16,427.74	0.1439	0.1234	0.0012		0.0092		$0.0009	0.1347
Maintenance Shafts and Drifts	61,297.10	0.5368	0.3447	0.1332	0.0244	0.0003			0.5026
General Underground	34,378.62	0.3011	0.1709	0.0595		0.0375		0.0140	0.2819
Pumping	11,383.47	0.0996	0.0179	0.0006	0.0499	0.0241	0.0008		0.0933
Surface	29,681.31	0.2599	0.1143	0.0044	0.0182	0.0637	0.0033	0.0395	0.2434
Engineering	8,373.00	0.0733	0.0665	0.0020		0.0001			0.0686
Assaying	19,837.19	0.1737	0.0921	0.0361	0.0182	0.0120	0.0003	0.0039	0.1626
Supervision	31,936.94	0.2797	0.2460	0.0038		0.0083		0.0038	0.2619
Total Ore Extraction	$716,939.22	$6.2782	$3.9720	$0.8927	$0.7105	$0.2297	$0.0111	$0.0621	$5.8781
Sinking	422.92	0.0037	0.0025	0.0004	0.0006				0.0035
Drifting	132,753.99	1.1625	0.5794	0.3026	0.2064				1.0884
Raising	37,320.17	0.3268	0.1416	0.1117	0.0527				0.3060
Total Exploration and Development	$170,497.08	$1.4930	$0.7235	$0.4147	$0.2597				$1.3979
Total Mining 114,195 Dry Tons	$887,436.30	$7.7712	$4.6955	$1.3074	$0.9702	$0.2297	$0.0111	$0.0621	$7.2760
Lead Ore Cr. 27,691 Dry Tons	146,584.13	5.2936							
Net Mining 86,504 Dry Tons	$740,852.17	$8.5644							

A complete statement of Departmental Unit Costs and Expense for each sub-department as shown above is furnished each department head along with the Departmental Production Costs for each period, and gives him sufficient data to determine the cause for any fluctuation in costs from month to month, and any change in efficiency, and enables him to properly instruct his supervisors and to correct any deficiency or waste. It will be noted that no detail is given of the Power Expense of Steam, Air, Air Drills. etc. The detail of the Power Expense is given in the Power Costs.

In determining the departmental unit costs, there can be shown either the total cost and the detail of the expense as illustrated above, or the cost can be figured for each item of expense. The latter method requires more time and office expense, and it is doubtful whether the detail costs are of any more value to the operating man for comparison and analysis than the detail expense. The detail costs should be delivered to the operating heads and supervisors as soon after the first of each month as possible, before the following month's work has absorbed their attention and to enable them to put into immediate effect any changes that the cost statements indicate as necessary or beneficial. An elaborate cost sheet received the fifteenth of the following month can not be of as great a value to the operating head as a simple one received on the fifth. An elaborate analysis of each month's expense for each sub-department and unit is not necessary under proper supervision and management. Therefore detail costs for reference and record can be made up after the operating costs have been furnished the operating departments.

Detail Unit Costs.—While the Departmental Unit Costs, as illustrated, give sufficient detail for the supervisors of most of the sub-departments, in some of these departments where the work covers many places, such as Sinking, Drifting, Raising and Stoping, it is necessary for the one in charge of the work to know the expense and cost of each piece of work under his direction. To meet this need Detail Unit Costs of each unit of each sub-department are compiled from the Monthly Underground Distribution Sheets, Form No. 47, and Statements of Costs for each Stope, Drift, etc. is made out and furnished the department head and the supervisors in direct charge, as follows:

Comparative Underground Stoping Costs for the Month of January—1919

Place	Labor	Explosives	Timber	Air	Total	Copper		Lead		Cost per Ton	
						Tons	Per cent	Tons	Per cent	January	December
140 Pros.....Surface Tunnel	$ 201.73	$ 36.37		$ 101.28	$ 339.88	111	3.25			$3.06	$4.47
4 Stope..... 200	1,033.47	60.19	$ 187.08	186.58	1,467.32	392	3.63			3.74	
122 Pros..... 300	789.41	44.43	95.60	119.05	1,048.49	369	5.57			7.84	4.38
5 Stope..... 200	1,055.72	188.30	126.58	203.74	1,574.34			1,295	5,69	1.21	1.17
5 Stope..... 200	445.12	79.39	53.37	85.90	663.78	546	5.28			1.21	1.17
3 Stope..... 400	735.17	7.24	155.27	5.04	902.72	220	22.87			4.10	2.92
3 Stope..... 400	1,079.18	10.64	227.92	7.40	1,325.14			323	6.47	4.10	2.92
16 Stope..... 600	940.86	157.70	365.36	328.73	1,792.65			467	8.72	3.81	3.64
19 Stope..... 600	1,065.29	51.59	409.04	113.72	1,639.64			217	11.27	7.55	3.54
Handling Supplies (Copper		165.07	246.90		411.97						
(Lead.....		24.03	84.74		108.77						
Total Copper.....	$18,876.95	$2,221.58	$3,322.98	$3,561.80	$27,983.31	9,915	5.81			$2.8223	$3.6588
Total Lead.....	3,530.45	323.35	1,140.43	535.75	5,529.98			2,302	6.92	2.4023	2.1402
Grand Total.....	$22,407.40	$2,544.93	$4,463.41	$4,097.55	$33,513.29	9,915	5.81	2,303	6.92	$2.7432	$2.9016

Average Tons per Man Shift..... January 3.2693 December 3.0733

Account	January	December	Increase	Decrease
Labor.....	$1.8342	$1.9531		0.1198
Explosives.....	0.2083	0.2146		0.0063
Timber.....	0.3653	0.3805		0.0152
Air.....	0.3354	0.3534		0.0180
Total.....	$2.7432	$2.9016		0.1584
Net Decrease...				0.1584

Shifts	Segregated Labor		Cost per Ton
1477⅝	Miners..... @$6.10	$ 9,013.51	$0.7378
1896¾	Muckers..... @ 5.85	11,095.99	0.9082
361⅞	Timbermen..... @ 6.35	2,297.90	0.1882
3736¼		$22,407.40	$1.8342

Comparative Average Assays

	Ounces Gold	Ounces Silver	Per Cent Copper	Per Cent Lead	Per Cent Moisture
Chutes All Ores.....			6.00	6.80	
Smelter All Ores.....	0.0108	3.5866	3.79		6.62
Oxide Tram.....			4.84		7.05
Oxide Smelter.....	0.0137	2.2463	3.32		6.56
Hi-Grade Tram.....			19.80		2.00
Hi-Grade Smelter.....	0.027	40.1200	21.24		2.00
Silicious Smelter.....	0.018	5.5500	4.01		7.23

In place of showing the expense for Labor, Supplies, etc., for each place and the total cost per ton for each place, the cost for each element of expense can be shown as well as the total cost if the operating department head and supervisors prefer.

A summary of the assays obtained on mine and smelter samples of ores stoped is shown for information of the one in charge of sampling. Usually the assays from mine samples are high and the comparative assay statement is given each month to inform the mine department and manager of the amount of the discrepancy.

A similar statement of the expense and cost of each Shaft, Drift and Raise is made, as shown on page 230.

There is summarized upon the statements of development costs the amount of development ore dumped into the shipping bins. A check should be made of this ore to see that it pays for itself.

When the mine consists of a number of shafts or divisions, Detail Unit Costs are determined for each shaft or each division, and at the end of each month or quarter comparative costs can be compiled as shown by the statement on page 231.

Such comparative costs are made on all the sub-departments, as well as on the details of each sub-department at any time that it is desired to ascertain the reason for differences. In making up such comparisons the factors that fluctuate the costs should be summarized below the comparative costs, as shown on page 232.

Practically all the factors that would fluctuate the costs for the two shafts are shown except feet trammed per car of ore and waste. By a careful examination of such a statement the reasons for most of the differences in costs can be obtained.

DAILY AND WEEKLY COSTS

The Exploration and Development and the Stoping are usually the largest sub-departments, in amount of expense, in the number of men, and number of places being worked. On account of the great number of men and places worked in these sub-departments and the rapid turn over of the labor, it is sometimes desirable to have daily costs of labor and supplies for each place that is being worked, to assist the supervisors to maintain a consistent and high degree of efficiency. To provide for this, the Underground Distribution Sheet, Form No. 47, is so drawn as to enable daily or weekly statements of cost of labor and supplies to be made up for each drift, raise and stope, by the mine timekeeper and furnished to the proper operating heads, as shown by Form No. 53.

In determining these daily and weekly costs the amount of labor expense is correct and usually the item of supplies is correct, but other expense items cannot be shown except as an estimate. However, any

Comparative Underground Drifting Costs for the Month of January—1919.

Place	Labor	Explosives	Timber	Air	Total	Feet Advanced	Cost per Foot		Material Cut
							January	December	
14 C. C. 100	$ 250.44	$ 206.24		$ 131.49	$ 588.17	49	$12.00	$14.09	Lime
19 C. C. 100	260.21	171.19	$ 2.80	126.16	560.36	48	11.67	10.67	Lime Pyrite
70 C. C. 700	255.96	186.07		126.16	568.19	42	13.54	12.53	Lime Pyrite
71 C. C. 700	109.22	74.36		62.19	245.77	22	11.17	11.63	Fossil Lime Crystals
235 Rz. Int. K. 900									
239 Rz. Int. K. 900	95.10	28.19	2.87	35.54	161.70	31	5.22		Sulfur, Iron and Copper
Handling Supplies		186.47	23.33		209.80				
	$4,258.20	$2,507.87	$313.98	$1,643.64	$8,723.69	689	$12.6614	$11.9952	

Feet Advanced Per Man Shift ..... January 1.0000 December 1.0429

Account	January	December	Increase	Decrease
Labor	$ 6.1803	$ 6.0096	$0.1707	
Explosives	3.6398	3.3296	0.3102	
Timber	0.4557	0.2874	0.1683	
Air	2.3856	2.3686	0.0170	
Totals	$12.6614	$11.9952	$0.6662	
Net Increase			0.6662	

Ores from Development and Repairs

	Copper		Lead	
	Tons	Per Cent	Tons	Per Cent
23 C. C. 100	24	4.84		
41 C. C. 200	123	4.50		
66 C. C. 400	43	8.27		
235 R. Int. "A" 500	198	6.39		
83 C. C. 600			15	5.89
71 C. C. 700			9	5.30
237 Rz. 700			60	8.39
255 Rz. 700	13	20.00		
256 Rz. 700			35	
257 Rz. 700	9	5.73		
21 C. C. 300	23	5.91		
247 Rz. Int. "A" 300			67.06	4.66
4 C. C. 400	2.6	8.30		
8 C. C. 400	7	12.15		
11 C. C. 400	115	16.09		
200 Int. A.			2	4.50
75 C. C. 600	18	5.83		
	575.6		221.06	

COMPARATIVE STATEMENT OF DRIFTING COSTS—JANUARY 1917. ACTUAL COST COMPARED WITH COST BASED ON ANTE BELLUM PRICES

	Drifting Cost per Foot											
	No. 1 Shaft		No. 2 Shaft		No. 3 Shaft		No. 4 Shaft		No. 5 Shaft		All Shafts	
	Actual Cost	Normal Basis	Actual Cost	Normal Basis	Actual Cost	Normal Basis	Actual Cost	Normal Basis	Actual Cost	Normal Basis	Actual Cost	Normal Basis
Labor	$5.6381	$3.7219	$4.8493	$3.2793	$3.5988	$2.4513	$3.5366	$2.3740	$4.9769	$3.2957	$4.4613	$2.9916
Explosives	1.6687	1.1507	1.7303	1.1934	1.7793	1.2270	1.2178	0.8399	2.4118	1.6631	1.8719	1.2909
Framed Timber	0.6222	0.4969	0.0598	0.0478	0.1427	0.1142	0.0668	0.0534	0.1471	0.1174	0.1437	0.1151
Other Supplies	0.1135	0.1135	0.0893	0.0893	0.0514	0.0514	0.0777	0.0777	0.0321	0.0321	0.0631	0.0631
Power	1.3656	1.1980	1.9737	1.7300	1.2122	1.0814	1.1782	1.0508	1.6964	1.5142	1.5593	1.3818
Total	$9.4081	$6.6810	$8.7024	$6.3398	$6.7844	$4.9253	$6.0771	$4.3958	$9.2643	$6.6225	$8.0993	$5.8425
Feet	492.5	492.5	1922.0	1922.0	1769.0	1769.0	1037.0	1037.0	2248.5	2248.5	7469.0	7469.0
Feet Per Shift	1.0498	1.0498	1.2737	1.2737	1.6611	1.6611	1.7198	1.7198	1.1895	1.1895	1.3485	1.3485

COMPARATIVE ORE EXTRACTION COSTS PER WET TON FOR FEBRUARY—1917

Mine Department	Shaft No. 1		Shaft No. 2	Over No. 1	Under No. 1
Stoping	$1.1656		$3.0117		$1.8461
Tramming and Tracks:					
Tramming Ore $0.3772					
Tramming Waste 0.3628					
Underground Tracks 0.1316	0.8716		0.4106	$0.4610	
Station Tending and Caging	0.1136		0.0651	0.0485	
Hoisting	0.4443		0.2148	0.2295	
Top Landing and Loading Ore	0.2349		0.0937	0.1412	
Repairs Shafts, and Drifts	0.8388		0.2595	0.5793	
Underground Lighting $0.0549					
Underground Ventilating .0124					
General Underground 0.3616	0.4290	0.1067	0.2559	0.1731	
Engineering and Assaying		0.1492			
Pumping	0.1983		0.0643	0.1340	
Underground Supervision	0.2144		0.2081	0.0063	
General Surface	0.0840		0.1301		0.0461
	$4.5945		$4.7138	$1.7729	$1.8922
Net Cost Under No. 2	0.1193				
	$4.7138				
Total Wet Tons Stoped	11598		17977		6379
Wet Tons Per Man Shift Stoping	7.66		2.65	5.01	
Per Cent Copper Per Wet Ton	5.30		4.36	0.94	
Number of Stopes Worked	20		37		17
Total Tons from Largest Stope	3400		2286	1114	
Average Tons Per Stope	580		486	94	
Total Feet Development	2528		2125	403	
Feet Development per Ton Stoped	0.218		0.119	0.099	
Feed Advanced Per Man Shift	1.274		1.238	0.036	

increase or decrease in wages of labor and cost of supplies will fluctuate the cost per ton, or per foot, regardless of the efficiency as shown by the tons per man shift. When both prices and efficiency are fluctuating, as has been the case during the war period, it is difficult for the foremen and shift bosses to determine what proportion of the increase or decrease is due to fluctuation in prices and what to efficiency. For this reason there sometimes has been substituted for the daily or weekly statement of costs of Stoping, Drifting, Raising, etc., a Daily and Weekly Statement of Production, as shown by the following form:

Weekly Statement of Production Factors for Stoping, February 1st to February 7th, Inclusive, 1919

Place		Shifts			Total Shifts	Total Cars Ore	Average Cars Ore Per Man Shift	Per Cent Copper	Per Cent Lead	Powder		Timber		Air	
		Miners	Muckers	Timbermen						Total	Average Per Car	Total	Average Per Car	Total	Average Per Car
2 Stope	100	9½	9	1¾	20¼	22	1.1	14.00		68	3	858	39	16	0.73
2 Stope	200		1	¾	1¾							86			
4 Stope	200	35	40	4½	79½	219	2.8	5.57		395	2	3,858	18	68	0.31
5 Stope	200	16		4½	20½	80	3.9	8.13		206	2	289	4	29	0.36
					********	******	********	*********	*********	******					
					********	******	********	*********	*********	******					
109 Pros	700	2	2		4	42	10.5	3.54		45	1			5	0.12
2 Stope	800	49	75	1½	125½	648	5.17	5.08		260		4,536	7	47	0.07
11 Stope	800	13	13		26	77	3.0	9.60		158	2			26	0.34
12 Stope	800	28½	55½		84	189	2.3	3.22		118	1	533	3	11	0.06
1 Stope	900	9	9½		18½	47	2.6	2.30		21		303	7	4	0.09
3 Stope	900	26	25	1½	52½	269	5.1	5.75		373	1	1,024	4	43	0.16
4 Stope	900	13	31	7	51	220	4.3	4.55		47		889	4	4	0.02
5 Stope	900	51	55¼	12½	118¾	605	5.1	2.25		582	1	8,725	14	129	0.21
		609¾	708	121½	1,439¼	4,817				5,661		59,209		876	

	This Month to 15th	Last Month
Average Cars Ore Per Man Shift	3.347	3.909
Average Sticks Powder Per Car Ore	1.175	1.356
Average Feet Timber Per Car Ore	12.292	7.172
Average Hours Air Per Car Ore	0.182	0.164
Per Cent Copper Per Car Ore	6.689	5.922

Such a statement gives the factors concerned in production or operation for which the supervisors are directly responsible, and these factors are always the same regardless of prices of supplies or scale of wages. They are the things that are seen and contacted each day, and such statements are of more interest and value to the operators in charge than statements of results in dollars and cents.

A number of small producers do not wish to go to the expense of determining daily costs, but instead get out a daily labor and production

Daily Statement of Cost

Report of Stope Costs For _____ 19____

Place	No. Cars Ore	No. Tons Ore	Shifts Labor				Total Cost			Cost per Ton			Tons Man Shift	Remarks
			$4 00				Labor	Timb'rs Lagging	Powder &c.	Labor	Supplies	Total		

FORM 53.

report for the information of the head of the mine department similar to Form No. 54. Similar reports can be made up for Milling, Smelting, etc., and will keep the department head in daily touch with the work being performed.

COMPARATIVE COSTS

It is customary for some mines to make up comparative costs for each department, sub-department and unit for each period. While such costs are of great value, it is doubtful whether or not the benefit to the operating heads of comparative costs on each sub-department and unit for each period will offset the expense involved and the delay that results in getting out such cost statements.

However, it is best to furnish each department head each month with a comparative departmental cost statement as shown by the following form:

COMPARATIVE ANALYZED SUMMARY OF MINING COSTS PER WET TON FOR EACH DEPARTMENT AND EACH ELEMENT OF EXPENSE FOR JUNE—1918

Account	Cost Per Wet Ton—8,062 Wet Tons Stoped					Average Cost Per Wet Ton Stoped			
	Labor	Supplies	Power	Shops and Repairs	Replacements	Expense	8,062 This Month	9,249 Last Month	51,289 Year to Date
Ore Extraction Expense:									
Stoping	$2.4050	$0.7312	$0.4022				$3.3384	$3.1712	$3.2044
Tramming and Tracks	0.4384	0.0626		$0.0257			0.5267	0.4550	0.4902
Station Tending and Caging	0.1203	0.0006		0.0052			0.1261	0.1241	0.1283
Hoisting	0.1330	0.0082	0.3125	0.0495			0.5032	0.5032	0.2810
Top Landing and Tramming	0.1397	0.0046		0.0132		$0.0012	0.1587	0.1390	0.1375
Maintenance Shaft and Drifts	0.4596	0.2019	0.0290				0.6905	0.5683	0.5249
General Underground	0.1856	0.0589		0.0454		0.0185	0.3084	0.2890	0.2807
Pumping	0.0216	0.0007	0.0605	0.0447			0.1275	0.1256	0.1152
Surface	0.1116	0.0005	0.0218	0.0467		0.0856	0.2662	0.2068	0.2468
Engineering	0.0917	0.0002					0.0919	0.0830	0.0888
Assaying	0.1046	0.0076	0.0218	0.0206		0.0042	0.1588	0.1830	0.1674
Supervision	0.3027	0.0030		0.0070		0.0029	0.3156	0.2697	0.2935
Total Ore Extraction	$4.5138	$1.0800	$0.8478	$0.2580		$0.1124	$6.8120	$6.1179	$6.1587
Drifting	0.6406	0.3405	0.2417				$1.2228	$1.3601	$1.2167
Raising	0.1168	0.0836	0.0420				0.2424	0.3397	0.3929
Total Exploration and Development	0.7574	0.4241	0.2837				$1.4652	$1.6998	$1.6096
Total Mining	$5.2712	$1.5041	$1.1315	$0.2580		$0.1124	$8.2772		
Total Last Month	$4.8657	$1.4835	$0.3737	$0.1945		$0.0441		$7 8177	
Total Year to Date	$4.9259	$1.4328	$1.0757	$0.2266	$0.0257	$0.0816			$7.7683

DAILY MINE REPORT

SHATTUCK ARIZONA COPPER CO.

_____ 19____ _____ SHAFT

| DAY | LABOR (IN SHIFTS) | | |

If the cost of any particular sub-department or element of expense shows an unreasonable increase or decrease, then detail and comparative costs can be worked up to show the reason therefor. In this manner, the expense and time involved in obtaining exhaustive detailed comparative costs is avoided, and the operating heads are not burdened with voluminous cost statements of uncertain value.

SHOPS AND POWER COSTS

When the size of the shop force will justify a cost system, accurate shop costs of each job should be kept. However, the power costs should be ascertained each month regardless of the size of the power plants.

Shop Costs.—When the amount of the shop work is large, there should be kept shop costs for each job, using a form similar to Form No. 55

No.	Date	191							
JOB		LABOR				SUPPLIES			
Workman									
Hours	Rate per Day								
Material									
Date Item Completed									
Shop Expense									
Cost per Item									
Charged									

FORM 55.—Daily Job Report.

The amount of the daily shop labor charges for each job being compiled from Daily Labor Reports, Form No. 48 and the amount of the supply charges being compiled from Supplies Issued Record Sheets, Form No. 18 and the proportional charge for Shop Expense being taken from the Shop Sheets, Form No. 49 at the end of each month. A statement of cost for each job is made when the work is completed.

However, when the shop force is small and fixed from month to month as is usually the case with the majority of mines, a simple method of showing the shop costs is to distribute the expense for each job from each shop upon Shop Sheets, Form No. 49 and to summarize the shop charges upon From No. 50 and make up statements of Shop Expense for each job, as follows:

Shop Expense and Costs for January—1919

Expense

	Machine Shop	Blacksmith Shop	Carpenter Shop and Sawmill	Total
Labor: *Expense:*				
Shops	$3,935.62	$ 754.50	$1,142.29	$5,832.41
Overhead	221.21	42.42	235.13	498.76
Total Labor	$4,156.83	$ 796.92	$1,377.42	$6,351.17
Supplies: General Operation:				
General	$ 44.43	$ 65.19	$ 0.57	$ 110.19
Iron and Steel			2.20	2.20
Lumber and Timber		1.97		1.97
Machinery	13.04	0.46		13.50
Pipe and Fittings	0.27	2.50		2.77
Oils and Greases	33.89		0.82	34.71
Tools	48.24	4.38	14.62	67.24
Supplies: Drill Sharpener:				
Iron and Steel		1.03		1.03
Fuel		120.95		120.95
Machinery		0.92		0.92
Total Supplies	$ 139.87	$ 197.40	$ 18.21	$ 355.48
Bills Audited:				
Water		5.00		5.00
Electricity	18.27	4.60	13.24	36.11
Total Bills Audited	18.27	9.60	13.24	41.11
Total Shops	$4,314.97	$1,003.92	$1,408.87	$6,727.76

Costs

Details of Work:				
Underground Track—New	$ 17.16	$ 67.69		$ 84.85
Surface Track—New		3.79		3.79
Underground Tools and Sundries	77.29	127.14	$ 80.76	285.19
Surface—General	3.82		0.51	4.33
Surface—Heating		3.77		3.77
Total Development Overhead	$ 98.27	$ 202.39	$ 81.27	$ 381.93
Boilers—Scaling	$ 282.01			$ 282.01
Boilers—Pumping Water	31.56			31.56
Sharpening Steel		$ 480.15		480.15
Total Power	$ 313.57	$ 480.15		$ 793.72
Shaft Hoist—Repairs	$ 105.74			$ 105.74
Mine Cars	127.60			127.60
Bell Signals	127.78			127.78
Chairs	32.33	20.79		53.12
Hoist—General	32.91	3.79		36.70
Hoist Brake Blocks			11.24	11.24
Hoist Sheave Wheels—Changing	33.26			33.26
Hoist Cable—Changing	14.26			14.26
Hoist Cages	96.05			96.05
Surface Tracks			25.06	25.06
Underground Water and Lights	23.17			23.17
Pump —General	668.99			668.99
Pumps—Steam Lines	167.42	24.62		192.04
Pumps Discharge Line	99.07			99.07
Surface Water and Lights	107.52		4.09	111.61
Surface Heating	14.89			14.89

SHOP EXPENSE AND COSTS FOR JANUARY—1919 (*Continued*)

	Machine Shop	Blacksmith Shop	Carpenter Shop and Sawmill	Total
Ore Chutes			$ 16.36	$ 16.36
Buildings			2.55	2.55
Assay Office	8.51	$ 3.78		12.29
Supervision—Dwellings Occupied	0.91		13.28	14.91
Boilers—General	$ 397.90		3.06	400.96
Boilers—Tools	22.66	24.45		47.11
Boilers—Steam Lines	20.25			20.25
Boilers—Oil Pumps	3.52			3.52
Compressors	60.12			60.12
Air Drills	119.59	5.68		125.27
Total Repairs	$2,284.45	$ 83.11	$ 75.64	$ 2,443.20
Boiler Tubes—Replacements	$ 97.86			$ 97.86
New Dinky Hoist	442.05	$ 7.56		$ 449.61
New Dinky Hoist House			$ 97.56	97.66
New Boiler Feed Pumps	39.32		6.13	45.45
New Dinky Cages	193.86	120.68		314.54
New Drill Steel		42.94		42.94
Total Replacements	$ 773.09	$ 171.18	$ 103.79	$1,048.06
New Mine Cars	$ 189.08	$ 13.26		$ 202.34
Flue Rattler	72.71			72.71
First Aid Boxes			$ 54.19	54.19
Ventilation Blowers	389.76	20.83		410.59
Total Construction and Equipment	$ 651.55	$ 34.09	$ 54.19	$ 739.83
Framing Timber			$1,031.63	$1,031.63
Pumping Oil	$ 24.68			24.68
Miscellaneous Handling			8.18	8.18
Total Handling Supplies	$ 24.68		$1,039.81	$1,064.49
Eaton & Smith		$ 16.00		$ 16.00
Shattuck Arizona Copper Co.				
Mill Platform			$ 54.17	54.17
Mill Pumps	$ 19.08	1.88		20.96
Mill Tools		5.66		5.66
Mill Crusher	63.35	7.58		70.93
Mill Launders		1.88		1.88
Mill Tanks	18.17			18.17
Mill Unloading Track	11.71			11.71
Mill Classifier	29.42			29.42
Mill Meter Reading	14.04			14.04
Mill Miscellaneous	13.59			13.59
Total Accounts Receivable	$ 169.36	$ 33.00	$ 54.17	$ 256.53
Total Shop Work	$4,314.97	$1,003.92	$1,408.87	$6,727.76

At the end of each quarter the Shop charges can be summarized as to total charges for each job and will serve as a guide as to whether or not the shop charges are excessive.

Theoretically there is always a certain amount of dead time in the shops which should be pro-rated. However, in operation it is difficult to ascertain the amount of dead time, unless the shops are sufficiently large to justify a timekeeper at the works who will check the distributions of each man's time. Due to the fact that it is necessary to keep the shop force intact from month to month, a certain amount of miscellaneous

work is always kept in reserve to be done on dead time, and any dead time for each day that cannot be put upon such work is absorbed in making daily distributions.

POWER COSTS

The Power Costs are determined upon the production or operating factors of the Compressor Plant, Electric Plant and Air Drills, all of which are under the supervision of the Mechanical Department.

Boiler Horse Power Costs.—To obtain the Boiler Horse Power Cost for each period it is necessary to keep an accurate record of the amount of fuel consumed and of the amount of water evaporated. From these two factors the amount of Boiler Horse Power Produced, and the efficiency of the boilers is obtained, usually by the Mechanical Department.

To obtain the cost per boiler horse power, the amount of the average horse power is divided into the total and into each element of expense, as shown by the following statement:

BOILER HORSE POWER COST FOR JANUARY—1919

Boiler Expense:			
Barrels Fuel Oil			3,756.24
Gallons Water Evaporated			1,878,120.00
Gallons of Water per barrel of Oil			
Average Boiler Horse Power			666.45
Efficiency of Boilers, Per Cent			74.41
		EXPENSE	COST PER B.HP.
Labor—91 Firemen @ $5.85		$ 532.35	$ 0.798
Supplies—Fuel Oil		9,992.27	14.993
Shops		313.57	0.473
Scaling	$ 282.01		
Pumping Water	31.56		
Repairs		1,861.41	2.792
General	$1,790.53		
Surface Steam Lines	20.25		
Boiler Oil Pump	3.52		
Tools	47.11		
Bills Audited—Water		475.25	0.713
Replacements—Retubing		30.44	0.045
		$13,205.29	$19.814

The determining of the cost of steam is one of great importance and should be carefully ascertained each month and occasional checks should be made against the boilers by computing the amount of steam consumed by the different units, to be sure there is no material loss in transmission.

FACTORS NECESSARY TO DETERMINE BOILER HORSE POWER

The pounds of water that should be evaporated per hour per Boiler Horse Power will depend upon the gauge pressure and the temperature

of the feed water. For a gauge pressure of 125 lb. and a feed water temperature of 165°, the factors for determining Boiler Horse Power and the efficiency are, as follows:

FACTORS FOR FIGURING BOILER HORSE POWER

Heat Units necessary to change one pound of water to steam with a gauge pressure of 125 lb. and the feed water at 165°...	1,059.200
Pounds water evaporated per hour per boilers horse power ...	31.608
Pounds water one pound fuel oil should evaporate..... (18,250 divided by 1,059.2)	17.230
One gallon of water weighs 8.3448 lb.....	
One gallon of fuel oil weighs 7.7500 lb.....	

The Cost Department should keep the record of water to boilers and of oil consumed and have the formulæ for determining boiler horse power, so that the Mechanical Department's reports on boiler horse power can be checked.

Compressor Costs.—The cost of compressed air is computed per thousand cubic feet of free air against the expense of operating the compressor in the same manner as in obtaining Boiler Horse Power Cost.

Air Drill Operating Cost.—The cost of operating Air Drills is determined per hour of air consumed by Air Drills. To obtain the total Air Drill's Hours, a summary is taken from the Distribution Sheets, Form No. 47 and the total hours are divided into the total and into the detail expense compiled from the Cost Ledger and from Summary Sheet, Form No. 50 and a Statement of Air Drill's Costs is made up in form similar to that shown for Boiler Horse Power Cost.

Air Drill Repair Costs.—In order to know what drills are efficient and which are not it is necessary to keep a record of operating repair costs of each class of drills. Such a record is usually compiled as shown on page 242.

The drill that requires less repairs is usually the one that is most efficient of its class. However, a record should be kept of the footage obtained from each class of drill for each class of ground.

While the air drill expense itself is not large, upon the efficiency of the drills depends to a large degree the efficiency of the development and of stoping, usually two of the largest items of expense in mining.

AIR DRILL REPAIR COSTS FOR MONTH OF MAY—1918

Make and Type of Machine	Class of Drill	Shop No.	Times Repaired	Labor	Supplies	Total	Total 8-Hour Service Units	Cost per 8-Hour Service	Number of Machines in Service
Cochise 7.....	Chippie	5	1	0.67	1.00	1.67			
		14	1	1.32	2.56	3.88			
		15	1	0.66	1.68	1.34			
Mine Supplies....						8.81			
				2.65	5.24	16.70	97.000	0.1722	19
Waugh *V*-16.....	Stoper	7	1	0.67	0.35	1.02			
Mine Supplies....						1.76			
				0.67	0.35	2.78	118.375	0.0024	23
BCRW-430 Ingersoll.....	Jackhammer	10	2	2.03	11.18	13.21			
Mine Supplies....						59.94			
				2.03	11.18	73.15	32.500	2.2508	10
Cochise 24.....	Jackhammer	1	1	0.67	0.68	1.35			
Mine Supplies....						0.02			
				0.67	0.68	1.37	1.750	0.7830	1
Cochise *RHH* 36..	Jackhammer	2	1	0.66	0.68	1.34			
Mine Supplies....						22.30			
				0.66	0.68	23.64			1
Denver Clipper...	Water	4	1	0.66	4.03	4.69			
		5	1	0.67	1.83	2.50			
		10	1	0.67	1.64	2.31			
		12	1	0.66	0.28	0.94			
Mine Supplies....						26.91			
				2.66	7.78	37.35	63.625	0.5871	16
Waugh 60.....	Water	5	1	0.67	0.33	1.00			
		6	1	0.67	2.52	3.19			
		11	1	0.66	0.08	0.74			
Mine Supplies....						14.43			
				2.00	2.93	19.36	136.375	0.1420	10

COST OF PREPAID EXPENSE

The principal items of Prepaid Expense consist of Repairs and Replacements. The Prepaid Insurance Cost is shown as one charge the first of each year, and the cost of Suspense Items of advances for traveling, matters in suspense, etc., are shown either by Detail Expense Statements or in some of the other cost statements after the Suspense Items have been cleared.

A separate account is kept for each Repair and Replacement Job, and at the end of each period statements of Cost Details of Repairs and of Replacements are furnished to the Operating Head and to the Department Supervisors along with the other statements of costs. The statements are usually made up, as shown by the following:

DETAILS OF REPAIRS

	Labor	Supplies	Shops	Bills Audited	Sub-Total	Total
Tramming and Tracks:						$343.19
Mine Cars		$17.76	$242.27		$260.03	
Underground Tracks			83.16		83.16	
Station Tending and Caging:						94.38
Chairs						
Bell System			94.38		94.38	
Hoisting:						450.30
Cages	$3.69		111.27		114.96	
Dinky Hoist			6.73		6.73	
General	4.75	9.90	313.96		328.61	
Top Landing and Tramming:						8.14
W. H. Tracks			8.14		8.14	
General Underground:						348.29
Water and Lights		145.47	76.22		221.69	
Tools and Sundries			102.10		102.10	
Telephones			24.50		24.50	
Pumping:						869.11
General	1.38	270.92	590.77		863.07	
Columns			6.04		6.04	
Surface:						293.98
Buildings	6.51	34.19	17.06		57.76	
Ore Bins	2.90		10.31		13.21	
Water and Lights	1.38	80.44	82.08		163.90	
Heating		1.31			1.31	
Telephones			33.37		33.37	
General	4.22		3.75		7.97	
Fire Protection	16.46				16.46	
Assaying:						121.79
General			82.56		82.56	
Furnace			39.23		39.23	
Supervision:						14.53
Dwellings Occupied			14.53		14.53	
Total Ore Extraction Repairs	$41.29	$559.99	$1,942.43			$2,543.71
Boilers:						$142.90
General	$20.00	$19.79	$93.16		$132.95	
Steam Lines			8.43		8.43	
Feed Lines			1.52		1.52	
Compressor:						74.82
General			56.35		56.35	
Condenser			18.47		18.47	
Air Drills:						692.03
Air Lines			13.36		13.36	
Hose and Fittings		136.26	88.49		224.75	
General		341.47	112.45		453.92	
Total Power Repairs	$20.00	$497.52	$392.23			$909.75

These statements keep the Operating Heads informed of the amount of Repairs and Replacements for each job and in total, and such segregations allow the Repair and Replacement charges to be shown separately upon the Operating Cost Sheets.

If any item of expense is unusual the Detail Sheets are consulted for the facts.

ASSET COSTS

The Asset Costs consist of Administrative Asset Costs and Operating Asset Costs. The Administrative Asset Costs of Mine Property and Investments are shown by the accounts in the Administrative Ledger.

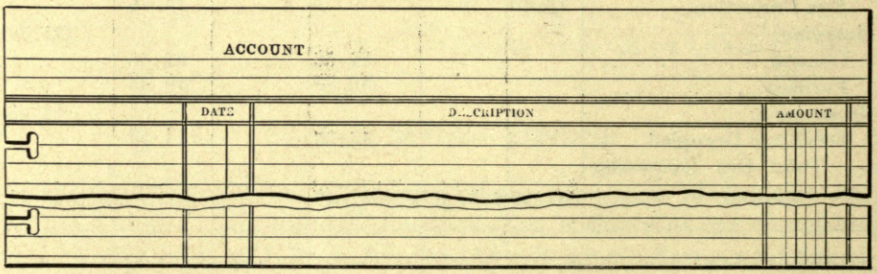
The Cost Details of Development of Mine Property that is charged to the property account are kept in the same manner as the Development Costs of Operation.

The principal Operating Asset Costs consist of:

Construction and Equipment,
Materials and Supplies, and
Accounts Receivable.

CONSTRUCTION AND EQUIPMENT COSTS

Segregations of the expense are kept for each unit of Construction and Equipment and recorded upon Summary Forms No. 50 and in the Cost Ledger, in the same manner as with Repairs and Replacements, and statements of the details of the expense are made up from Form No. 50 for each unit for each period in the same form as for Repairs and Replacements.



FORM 56.—Record of Equipment.

However, in order that a concise summary of the Construction and Equipment may be obtained, a control account for the total equipment of each department is also carried in the ledger, as shown on Chart XIV and by Cost Accounts Numbers 110 to 127 inclusive.

The detail unit costs of equipment are checked against the estimated costs and also can be used for establishing schedules of depreciation when the latter is based upon the life of each piece of equipment.

The control equipment accounts serve to show the amount of equipment assets in concise form and are used as reference and when determining the amount of insurance that is to be carried.

In order to have a complete record of all equipment, the description of each item together with total cost, and the date each item was charged out, is recorded upon Form No. 56. At the end of each year a copy of this record is made and a check obtained by inventory of the equipment. If any equipment cannot be located, a satisfactory explanation must be given by the one responsible therefor. By this means, the loss of small equipment by theft, having been loaned and not returned, etc., can be reduced to the minimum. Also the correct description of any piece of equipment, and its cost can be quickly ascertained and its life known.

MATERIALS AND SUPPLIES COSTS

The cost of each item of materials and supplies is not obtained from the Segregation Sheets but from the invoices of material purchased, and from the expense bills of freight paid.

The procedure and records involved in the purchase, transportation and storage of materials and supplies is under the jurisdiction of the Purchasing Department, and not the Accounting Department. However, the costing and recording of the materials and supplies as received and as disbursed are done to conform with the requirements of the Accounting and Costing Departments.

Upon the receipt of each invoice by the Puchasing Department, or by the Accounting Department, if there is no Purchasing Department, and after the invoice has been checked against the order, and as to prices and extensions, the items appearing on the invoice are listed upon a Goods Received Cost Sheet (Form No. 57), which, together with the invoice and expense bill are delivered to the Storekeeper.

The Storekeeper checks the quantity of materials and supplies as received against the invoice and ascertains the accurate net weight of each unit. He then enters the invoice and freight cost for each item on the Goods Received Sheet. If the handling is pro-rated over the supplies as received, he also enters the proportional cost of handling. The total cost for each invoice item is listed in the "Total Cost" Column, and the unit cost entered in the "Cost Per Unit" Column A "Stock Record" Card (Form No. 17) or sheet is made out for each item giving complete description and the necessary data entered thereon under the heading of "Stock Received."

The stock record cards or sheets are kept in an alphabetic file as to stocks, and show the delivered cost of each item of materials and supplies purchased, and support the cost of each stock appearing in the Cost Ledger and the Materials and Supplies Account in the General Ledger.

SHATTUCK ARIZONA COPPER CO.

GOODS RECEIVED COST SHEET

From _____

Date of Invoice _____

Date Goods Received _____ 191__

Invoice No.

Order No.

Arrived via _____ Charges _____

Handling Charge _____

Car No.
Car Initials
Packages

Calculation of Costs on Invoice No. _____ Order No. _____

From _____

Line No.	ARTICLE	Pkg. No.	Quantity	WEIGHT IN POUNDS Gross	WEIGHT IN POUNDS Net	Total Cost		Cost per Unit
1								
2								
3								
4								
5								
6								
7								
8								
9								

Line No.	Invoice Cost		Freight		Handling				Total Cost	
1										
2										
3										
4										
5										
6										
7										
8										
9										

FORM 57.—Material and Supply Cost Sheet.

As supplies are issued to operations they are written off of the supply cards and charge tickets made, as explained under Supplies Issued.

Accounts Receivable Costs.—Accounts Receivable originate as a result of purchases made or work or jobs performed for others. If purchases are made for others, the cost of the purchase is ascertained in the same manner as the cost of materials and supplies. If work or jobs are performed for others the cost is ascertained along with the operating costs. Usually a certain percentage is added to cover overhead and bookkeeping in determining Accounts Receivable Costs, and this percentage is credited to "Refunds and Discounts, Operating Sales," when the account is collected.

Distributing the Cost Sheets.—The detail unit costs for each period of Sinking, Drifting, Raising, Stoping, etc., are the ones that are compiled first, and sufficient copies of these costs are furnished the proper department heads to give each supervisor a copy.

The departmental production costs and departmental unit costs are then ascertained and a copy furnished each department head.

Copies of all operating costs are furnished the Manager and as much of the operating costs as are desired are furnished the directors and officers.

Assembling the Cost Sheets.—All the operating costs except the Detail Unit Costs of Sub-departments should be compiled upon sheets of uniform size, and sufficient copies made to supply the Manager, Officers and Directors. These cost sheets should then be assembled, as follows:

First: Total Operating Production Costs, and Summary of Production and Credits,
Second: Departmental Production Costs,
Third: Departmental Unit Costs,
Fourth: Repair and Replacement Costs,
Fifth: Shop and Power Costs,
Sixth: Construction and Equipment Costs.

After the cost sheets for each period have been assembled they should be combined with the Operating Statement and Schedules and the Profit and Loss Statement, and enclosed in an appropriate binder with an index to allow of convenient and ready reference to be had to the results of any one period.

There should accompany the Cost Statements to the Manager and other officers, a report analyzing the Operating Statement and Schedules and the profit and loss for the period, and showing the fluctuation in costs and the reasons therefor. In order to make this report valuable, it should be confined to matters of interest to the Manager and Directors.

Neither the Material and Supply Costs nor the Accounts Receivable Costs are detailed on Cost Sheets. The cost of each item of materials

and supplies is scrutinized by the Purchasing Department when received from the Storekeeper, who also compares the cost with previous costs when making entries on stock record cards.

STATISTICS

In order to analyze properly the results of operations in costs, efficiency, etc., for any period of month or year, it is necessary to compile monthly and yearly statistic of costs, efficiency, earnings, market prices of metals, etc. from the beginning of production to date. The statistics will need to be of such a nature as to meet the requirements of each business. They should not be too much in detail but more of a general nature, so that the increases and decreases from month to month and year to year of the principal factors of costs, efficiency, earnings, etc. can be quickly ascertained and the tendency towards higher or lower levels of costs or earnings can readily be seen and explained.

Without the proper statistics for comparison with the results of each period, it is difficult to analyze the accounting and costing data, or make a proper report of the results of operations for any one period.

ECONOMIC ACCOUNTING

After the accounting and costing procedure have been firmly established and accurate costs are being obtained, attention should be given to determining mine, mill and smelter losses at different prices of metals. When the market prices of metals are high the losses are much greater than when metal prices are low. When metals are high the problem is to obtain the best possible economic recovery. But when prices are low, it is sometimes better to get the best possible cost at the expense of a high recovery. At times the gain in cost is more than offset by the increase in losses, while again the increase in cost is less than the decrease in losses. The most economical cost is not always the lowest cost, neither is the highest recovery always the most economical one.

In some instances a standard of mill or smelter recovery or costs is set on low prices of metals and adhered to even when the price of the product has doubled.

The solving of these problems requires great pains and a close working contact between the accounting, production and engineering departments, and is a field of activity in which a great deal of intelligent effort can be exercised to the benefit of the industry.

FORMS

Forms are a necessary means of obtaining uniformity in accumulating accounting and cost data, and should be so constructed as to conduce to efficiency and the obtaining of correct data without duplication.

Forms improperly drafted and ruled are always a source of annoyance and result in waste of time and material, and the compiling of data improperly.

The forms illustrated herein are only the more important ones used in operations. They have been arranged in the order in which they are compiled in actual operations of a mining business. However, as the requirements of each business and the methods of mining and disposing of the products, as well as the laws of each state, etc., are not uniform, it is impracticable to construct forms that would be applicable to all classes and kinds of mining.

The forms presented are simply complimentary to the text and for use of mines of the nature designated, but of course, can be used as guides in drafting forms for mining operations differing in methods of operation or character of products.

In drafting a form the principal consideration is to obtain the ruling and arrangement that will allow the compiling of the data with the least effort, and that will give all the information desired or obtainable. However, other considerations are the quality of the paper, the size of the form that can be cut with the least waste, and that the columns are neither too large nor too small to accommodate the data to be compiled and that there is no duplication of information contained on other forms.

A careful consideration of such matters will result in large savings in purchase of supplies as well as in labor of compiling.

Some of the forms presented are of great value as they have been worked out after careful experimentation and much thought and experience and will result in saving of labor and time and the obtaining of facts in a clear concise manner by anyone having use for them.

Each form should bear a heading concisely stating for what purpose the form is to be used. Some of the forms herein do not bear the proper headings, but have been presented as they had been drawn.

Some of the forms are original, while others are more or less standard in mine accounting practise.

CHAPTER XXIV

APPENDIX

SIMPLE SYSTEM OF MINE ACCOUNTS

Practically all of the mining companies expend large sums in exploration of outside properties taken under option. Such work is generally done on a small scale at the beginning under the direction of a superintendent who also attends to the keeping of the records and the disbursing of the money. Therefore, a simple system of records and reports must be devised that can be easily handled by the one in charge of operations, and that will furnish the information necessary to allow of proper bookkeeping at the head office.

A large percentage of such prospects are eventually abandoned and an elaborate and expensive system of accounts is not desired. To fill the need of such operations, a simple system of records and accounts must be devised that can be easily handled by the mine superintendent at the beginning of operations, and later by a timekeeper and supply clerk. An outline of such a system is given, as follows:

Instructions to Superintendent in Charge of Operations, Advising of Necessary Reports and Records to be made at the Mine

The books of the Mine will be kept in the General Office. However, you will keep records, make distributions and reports, as follows:

RECORD AND PAYMENT OF LABOR

You will record on the pay-roll furnished you Form No. , the record of all labor performed either by daily wages, or by contract, and issue cheques in favor of each person on pay-roll for the net amount due each after all deductions for store, etc. have been made. You will take a signed receipt, Form No. , from each person upon delivery of cheque.

At the end of each month after you have closed and balanced your roll you will make a copy of the monthly pay-roll and forward it to the General Office.

RECORD AND PAYMENT OF INVOICES AND BILLS

You will pay all bills of expenses and invoices of material, which should be submitted to you in duplicate. As soon as the bills have been checked and found correct, you will make vouchers in duplicate for each bill or invoice, or for all invoices in any one month of the same Company, Firm or Person. You will mark one of the vouchers original and the other duplicate and attach the original invoice and the duplicate invoice to the vouchers and will enter upon the voucher record Form No. , a record of

each voucher made. After the vouchers have been made out and recorded you will make out cheques for the amount of each voucher and upon delivering the cheque to the proper person you will have receipted both the original and duplicate vouchers. If you have to mail the vouchers and cheques you will notify the persons to receipt and return both the original and duplicate vouchers.

At the end of each month when you have paid all of the bills for which you have received invoices you will total the voucher record for that month and make a copy of it, and as soon as you receive back the receipted vouchers you will return the original vouchers with a copy of the voucher record to the General Office and keep your original record and the duplicate vouchers.

RECORD OF SUPPLIES RECEIVED AND USED

For the present you will not need to keep any record of supplies as used, but will charge out all supplies as purchased to one or more of the four general accounts named hereafter. To make it convenient for you to segregate and charge out the supplies as purchased you should group your supplies when ordering so as to have all supplies to be used for mining operations together and all supplies for construction together, also all the supplies for the store, etc., so it will be simple for you to make distribution when paying the bills.

However, for your convenience in keeping a record of supplies used on any particular job at the mine, you are furnished with a number of supply sheets Form No. .

RECORD OF CHEQUES ISSUED

You will draw all cheques upon the company, using the cheque furnished you, Form No. , in making payment for all labor or expense.

You will report each day, whenever you issue a cheque either for labor or for bills paid, a record of the cheque issued on Form , to the General Office, so that we may know how much money you have drawn out of your account and to enable us to keep sufficient funds in your account to cover your cheques. **This is very important and should not be overlooked.**

PURCHASES

In making purchases ask for and obtain invoices in duplicate, and in ordering your supplies arrange your orders separately for supplies, for construction and equipment, for mining, for store, etc. so that you can easily distribute them to the proper accounts when paying the bills. You will, for the present, not keep any stock account of supplies for mining, but charge out all supplies as purchased, regardless of whether or not they will be used immediately or at a later date.

DISTRIBUTION OF EXPENSE

Labor.—Each day you will keep a record as to the proper distribution of each man's time, using ordinary small time books, or a piece of paper, and at the end of each day you can summarize and enter these distributions upon a large sheet Form No. furnished you. The total amount of the money entered on this distribution sheet each day should equal the total amount of your pay-roll for each day.

Vouchers.—You will make on the back of each voucher a distribution of the expense or bills of material covered by the voucher and will enter such distribution in one or more of the columns on the voucher record, Form No. , when making your record of vouchers issued. If you wish to keep a more detailed record of the expense as paid, or of the materials as they are used, you can do this in any manner most convenient to yourself, and it would be well for you to keep as detailed a record of charges to the four general accounts as it is practicable for you to do.

Supplies.—As here-to-fore stated you will not need to keep any record of the mining supplies as used unless you desire to do so but will charge out all supplies to one of the four accounts upon making payment for supplies purchased. However, we are furnishing you with supply sheets which you may use to keep a record of the supplies as they are used for each job or piece of work in order to get a correct cost of each item of construction or mine operation. All supplies that are not for immediate use should be stored under lock and distributed by yourself or someone who is responsible.

DISTRIBUTION ACCOUNTS

In making your distribution of all labor, expense or supplies to the General Office you need not segregate the labor expense or supplies any further than the four general accounts, as follows:

1. *Construction and Equipment.*—To this you will charge all labor and supplies for all items of construction such as roads, houses, horses and burros, and all large equipment other than small tools, keeping your record of the cost of each.

2. *Mining Operations.*—To this will be charged all labor and supplies and small tools used in mining, keeping for your record a cost of each department of expense, such as Tunnel No. 1, Open Cut No. 2, Drift No. 2, Shaft No. 1, Cost of Distribution of Supplies, if there should be need for pack animals or other means to distribute supplies to different works, etc.

3. *General Expense.*—To this you will charge keep of horse, if any, expense for yourself, office expense, and all incidental expense not directly applicable to mining, operations or to construction and equipment, or to store.

4. *Store.*—If you run a store, then charge all expense in connection with the store and the cost of all goods purchased for the store to "Store" on the vouchers in payment of such. Sales from store should be made at a price to cover invoice and freight cost plus 20 per cent or whatever is necessary to meet competition or give the men the proper service.

CREDITS TO THE STORE

As you sell merchandise from the store to the men working for you, charge to each individual the amount of each purchase, keeping a record on store charge tickets Form , furnished you, and each day you will sort these tickets and total them for each person and enter the amount against each man's time on the pay-roll so that you will know at all times how much store charge there is against each man's time and avoid anyone over-buying his account.

At the end of each month when you total and balance the monthly pay-roll you will draw a cheque for the total amount of the store deductions, making the cheque in favor of the company and forward it to the General Office. This cheque should be entered on the roll and on the cheque register the same as any pay-roll cheque and extended to pay-roll column in cheque register. Pay-roll Statement for this cheque should be made out to the Company and sent to the General Office with the cheque. All pay-roll deductions should be handled in this way making cheque and statement to the person or company in whose favor deduction is made.

CASH SALES BY STORE

Cash taken in over the counter should be used for small purchases for store, such as eggs, etc., and should not be taken into your General Cash Account. Do not report these cash sales to the General Office. Treat your store as though it did not belong to the mine at all, and keep it separate.

KITCHEN AND BOARDING HOUSE

If you run a kitchen and boarding house handle all expense in connection therewith by vouchers, using new account No. 5 for Kitchen. Charges made by store for supplies to kitchen should be vouchered and cheque drawn in favor of the company and sent to General Office. Make charge to Kitchen Account on back of all such vouchers. Supplies, etc. for kitchen purchased elsewhere should be paid by voucher direct. Supplies sold from store to mine operations can be vouchered in same manner as to Kitchen. This will keep your store account clear by charges made at General Office. If you make deductions for Board, etc., on pay-roll handle the same as store deductions showing "Kitchen Deduction" on pay-roll statement. If you get cash for meals you can use money to pay for small supplies for kitchen.

CASH ACCOUNT

We are placing with the Bank, all monies subject to your cheque, and you will keep a record of the amount of cheques against this account and report amount of each cheque drawn against the account so that we may make deposits from time to time to take care of all cheques drawn by you.

We will notify you when deposits are made but it is probable that the notification may not reach you at a very early date. Mark all your cheques "————————."

PERSONAL CASH ACCOUNT. (CASH ON HAND)

In order to be able to take care of all purchases which must be paid by cash you will draw voucher and cheque payable to yourself as agent. In order to renew this cash as it is spent, from time to time, make out a voucher and cheque to yourself as agent for the amount of cash you have disbursed, attaching the receipts and charge these items to their respective accounts on back of voucher, and cash the cheque. This will put all your payments through your voucher register or pay-roll.

In case of part payment made in cash, make out two cheques to cover the amount of voucher and have the person endorse the check to you to cover the amount of cash paid. These cheques may be re-endorsed and cashed by you as you need the money.

Mail.—You should make arrangements for your reports to the General Office to be delivered to a point where they can reach us at the earliest date possible, and notify us immediately where to address your mail so as to get the best delivery to you. You should address all mail to the Company. ————————, ————————————

Freight.—Arrangements should be made with a responsible freighter to bring out your supplies as ordered for the store and mine. You can pro-rate freight charges to different accounts according to class of supplies freighted.

General.—Any information that you may wish in regard to the records and reports not covered by the above, will be furnished upon your request. Also we may issue instructions contrary to the above at any time in the future should we see fit to do so, or we may add to the above instructions.

NOTE:

A simple set of forms to accompany the above instructions can quickly be designed to meet the requirements of each prospect.

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